S
363.7287
H2CRHWP
1991

MONTANA STATE LIBRARY
3 0864 0015 2333 4

CENEX REFINERY

MONTANA HAZARDOUS WASTE PERMIT

Permit No. MTHWP-91-01

Prepared by :
Solid and Hazardous Waste Bureau
Department of Health and Environmental Sciences
Cogswell Building
Helena, MT 59620
(406) 444-1430
and
United States Environmental Protection Agency
Region VIII
999 18th Street
Denver Place Suite 500
Denver, CO 80202-2405

Draft issued April 21, 1991

STATE DOCUMENTS COLLECTION
JAN 16 2002
MONTANA STATE LIBRARY
1515 E. 6th AVE.
HELENA, MONTANA 59620

DEPARTMENT OF
HEALTH AND ENVIRONMENTAL SCIENCES

Solid and Hazardous Waste Bureau
STAN STEPHENS, GOVERNOR
FAX #(406) 444-1499

STATE OF MONTANA

OFFICE LOCATION: 836 Front Street, Helena, Montana
MAILING ADDRESS: Cogswell Building, Helena, MT 59620

Waste Management Section
(406) 444-1430

MONTANA HAZARDOUS WASTE PERMIT

Permit No. MTHWP-91-01

Permittee: Cenex Refinery
EPA Identification Number MTD006238083

Pursuant to the Montana Hazardous Waste and Underground Storage Tank Act (MHWUSTA) and regulations promulgated thereunder by the Montana Department of Health and Environmental Sciences (hereafter referred to as the Department), a permit is hereby issued to Cenex Refinery (hereafter referred to as the Permittee), to close, monitor, and provide post-closure care and corrective action for a hazardous waste land treatment unit located in Yellowstone County, Montana, near Laurel, at latitude 45° 39' 20" and longitude 108° 46' 30". This Permit consists of the conditions contained herein (including those in any attachments) and the applicable requirements in Title 16, Chapter 44, Administrative Rules of Montana (ARM) as specified in the Permit.

This Permit presumes that the information submitted in the Permit application as amended September 11, 1990, and as modified by subsequent amendments (hereafter referred to as the Application), is accurate and that the facility will be closed and monitiored as specified in the Application, except as modified by the Permit conditions. Where portions of the Application are incorporated herein by reference, they are deemed to be part of this Permit. Any inaccuracies or misrepresentations found in the Application may be grounds for the revocation or modification of this Permit (see ARM 16.44.116 through 16.44.118). The Permittee must inform the Department of any deviation from or changes in the information in the Application or in on-site operations which would affect the Permitte's ability to comply with the applicable regulations or Permit conditions.

Based on the above considerations, this Permit becomes effective on August 1, 1991, and shall remain in effect through August 1, 2001, unless revoked and re-issued, or terminated, or unless continued by the Department.

Signiture:_____ Date:_____

Dennis Iverson, Director
Montana Department of Health
and Environmental Sciences

TABLE OF CONTENTS

MODULE I - STANDARD CONDITIONS 1
I.A. DEFINITIONS 1
I.B. EFFECT OF PERMIT 1
I.C. PERMIT ACTIONS 1
I.C.1. Permit Modification, Revocation and Reissuance, and Termination 1
I.C.2. Permit Renewal 2
I.D. DURATION OF PERMIT 2
I.E. SEVERABILITY 2
I.F. DUTIES AND REQUIREMENTS 2
I.F.1. Duty to Comply 2
I.F.2. Duty to Reapply 2
I.F.3. Permit Expiration 2
I.F.4. Need to Halt or Reduce Activity Not a Defense 3
I.F.5. Duty to Mitigate 3
I.F.6. Proper Operation and Maintenance 3
I.F.7. Duty to Provide Information 3
I.F.8. Inspection and Entry 3
I.F.9. Monitoring and Records 4
I.F.10. Reporting Planned Changes 4
I.F.11. Reporting Anticipated Noncompliance 5
I.F.12. Transfer of Permits 5
I.F.13. Twenty-Four Hour Reporting 5
I.F.14. Other Noncompliance 6
I.F.15. Other Information 6
I.G. SIGNATORY REQUIREMENT 6
I.H. DOCUMENTS TO BE MAINTAINED AT THE FACILITY SITE 6
I.I. CONFIDENTIAL INFORMATION 7

MODULE II - GENERAL FACILITY STANDARDS 1
II.A. PERMITTED UNIT 1
II.B. INCORPORATION BY REFERENCE 1
II.C. SAMPLING, MONITORING, AND ANALYSIS 1
II.D. SECURITY 1
II.E. GENERAL INSPECTION REQUIREMENTS 1
II.F. PERSONNEL TRAINING 2
II.G. LOCATION STANDARDS 2
II.H. PREPAREDNESS AND PREVENTION 2
II.H.1. Required Equipment 2
II.H.2. Testing and Maintenance of Equipment 3
II.H.3. Access to Communications or Alarm System 3
II.H.4. Arrangements with Local Authorities 3
II.I. CONTINGENCY PLAN 3
II.I.1. Implementation of Plan 3
II.I.2. Copies of Plan 3

II.I.3. Amendments to Plan 3
II.I.4. Emergency Coordinator 3
II.I.5. Reporting 3
II.I.6. Updated Plan 4
II.J. RECORDKEEPING AND REPORTING 4
II.J.1. Operating Record 4

MODULE III - CLOSURE OF THE LAND TREATMENT UNIT 1
III.A. GENERAL INFORMATION 1
III.A.1. Applicability 1
III.A.2. Description of Land Treatment Unit 1
III.B. WASTE TREATED AND DISPOSED OF AT THE LAND TREATMENT UNIT 1
III.B.1. Hazardous Wastes 1
III.B.2. Nonhazardous Wastes 2
III.B.3. Waste Management Units 2
III.C. CLOSURE STANDARD 2
III.D. CLOSURE PLANS 2
III.E. AMENDMENT OF THE CLOSURE PLAN 3
III.F. CERTIFICATION OF CLOSURE 4
III.G. SURVEY PLAT 4
III.H HORIZONTAL AND VERTICAL DIMENSIONS OF THE TREATMENT ZONE 4
III.I. OPERATION OF THE LAND TREATMENT UNIT DURING CLOSURE 5
III.I.1. General Requirements 5
III.I.2. Disposal or Decontamination of Equipment 5
III.I.3. Measures to Control pH 5
III.I.4. Nutrient Addition 5
III.I.5. Tillage 5
III.I.6. Control Wind Dispersal 6
III.I.7. Establishment of Vegetative Cover 6
III.J. RUN-ON AND RUN-OFF SYSTEMS 6
III.K. INSPECTION OF LAND TREATMENT UNIT 6
III.L. FOOD CHAIN CROPS 7
III.M. LAND TREATMENT MONITORING REQUIREMENTS 7
III.M.1. General Requirements 7
III.M.2. General Sampling Methods 7
III.M.3. Selection of Random Sampling Sites 8
III.M.4. General Analytical Methods 8
III.M.5. Zone of Incorporation (ZOI) Soil Monitoring 9
III.M.5.b. Analytical Parameters 9
III.M.5.c. Sample Collection Methods 10
III.M.6. Treatment Zone (TZ) and Below Treatment Zone Soil (BTZ) Core Monitoring 10
III.M.7. Groundwater Monitoring 11
III.N. MONITORING EVALUATIONS 11

III.N.1. Zone of Incorporation Soil Monitoring Evaluation . . . 11
III.N.2. Treatment Zone and Below Treatment Zone Soil Monitoring Evaluation . . . 12
III.N.3. Groundwater Monitoring Evaluation . . . 13
III.O. REPORTING REQUIREMENTS . . . 13
III.P. RECORDKEEPING . . . 13
III.Q. COST ESTIMATE FOR CLOSURE . . . 14
III.R FINANCIAL ASSURANCE FOR CLOSURE . . . 14

MODULE IV - POST-CLOSURE CARE OF THE LAND TREATMENT UNIT . . . 1
IV.A. APPLICABILITY . . . 1
IV.B. POST-CLOSURE PERIOD CARE STANDARD . . . 1
IV.C. POST-CLOSURE PLAN . . . 1
IV.C.1. Written Plan . . . 1
IV.D. AMENDMENT OF PLAN . . . 1
IV.E. POST-CLOSURE OPERATION OF THE LAND TREATMENT UNIT . . . 2
IV.F. POST-CLOSURE CARE AND USE OF PROPERTY . . . 3
IV.G. POST-CLOSURE NOTICES . . . 5
IV.H. COST ESTIMATE FOR POST-CLOSURE CARE . . . 6
IV.I. FINANCIAL ASSURANCE FOR POST-CLOSURE . . . 6

MODULE V - GROUNDWATER MONITORING . . . 1
V.A. APPLICABILITY . . . 1
V.B. REQUIRED PROGRAMS . . . 2
V.C. GROUNDWATER PROTECTION STANDARD . . . 3
V.D.1. Definitions . . . 3
V.D.2. General . . . 4
V.D.3. New Well Location and Construction . . . 5
V.D.4. Sampling and Analysis Procedures . . . 6
V.D.5. Groundwater Elevation . . . 7
V.D.6. Monitoring Parameters . . . 7
V.D.7. Background Water Quality . . . 8
V.D.8. Other Conditions . . . 8
V.E. COMPLIANCE MONITORING REQUIREMENTS . . . 9
V.F. CORRECTIVE ACTION REQUIREMENTS . . . 14
V.G. CLOSURE/POST-CLOSURE . . . 16

MODULE VI - HAZARDOUS AND SOLID WASTE ACT REQUIREMENTS

MODULE I - STANDARD CONDITIONS

I.A. DEFINITIONS

Application: The information submitted by Cenex in the RCRA Part B Permit Application, Volumes 1 and 2, on November 7, 1985 and amended on September 11, 1990 and on February 19, 1991.

Cenex: Farmers Union Central Exchange

Department: The Montana Department of Health and Environmental Sciences.

Permittee: Cenex

Regulated Unit: Any hazardous waste management unit identified in Permit Condition II.A.

I.B. EFFECT OF PERMIT

The Permittee is allowed and required to close, monitor, and provide post-closure care and corrective action for a hazardous waste land treatment unit in accordance with the conditions of this Permit. Any further disposal of hazardous waste in this land treatment unit is prohibited. Issuance of this permit does not convey property rights of any sort or any exclusive privilege; nor does it authorize any injury to persons or property, any invasion of other private rights, or any non-compliance with state or local law or regulations. Compliance with this Permit constitutes compliance, for purposes of enforcement, with the hazardous waste provisions of the Montana Hazardous Waste and Underground Storage Tank Act, MHWUSTA, provided that compliance with the terms of this permit does not constitute a defense to any order issued or any action brought under 75-10-411 or 75-10-415, MCA, Section 106(a) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (42 U.S.C. 9606 (a), commonly known as CERCLA), or any other law providing for protection of public health or the environment.

I.C. PERMIT ACTIONS

I.C.1. Permit Modification, Revocation and Reissuance, and Termination

This permit may be modified, revoked and reissued, or terminated for cause as specified in ARM 16.44.116 through ARM 16.44.118. The filing of a request for a permit modification, revocation and reissuance, or termination or the receipt of notification of planned changes or anticipated noncompliance on the part of the Permittee does not stay the applicability or enforceability of any permit condition.

I.C.2. Permit Renewal

This Permit may be renewed as specified in Condition I.F.2. Review of any application for a Permit renewal shall consider improvements in the state of control and measurement technology as well as changes in applicable regulations.

I.D. DURATION OF PERMIT

This Permit is effective for a period through July 1, 2001 unless modified, terminated, or revoked and reissued. The Permit will be reopened for review by the Department in accordance with ARM 16.44.111 and may be modified at that time as provided in ARM 16.44.116.

I.E. SEVERABILITY

The provisions of this Permit are severable, and if any provision of this Permit, or the application of any provision of this Permit to any circumstance is held invalid, the application of such provision to other circumstances and the remainder of this Permit shall not be affected thereby.

I.F. DUTIES AND REQUIREMENTS

I.F.1. Duty to Comply

The Permittee shall comply with all conditions of this Permit, except to the extent and for the duration such noncompliance is authorized by an emergency Permit. Any Permit noncompliance, other than noncompliance authorized by an emergency Permit, constitutes a violation of MHWUSTA and is grounds for enforcement action; for Permit termination, revocation and reissuance, or modification; or for denial of a Permit renewal application.

I.F.2. Duty to Reapply

If the Permittee wishes, or is required by the Department, to continue an activity allowed by this Permit after the expiration date of this Permit, the Permittee shall submit a complete application for a new permit at least 180 days before this Permit expires.

I.F.3. Permit Expiration

This Permit and all conditions herein will remain in effect beyond the Permit's expiration date, unless such activities have been banned by State regulations, if the Permittee has not submitted a timely, complete application in compliance with ARM 16.44.119, ARM 16.44.120 and 40 CFR 270.18 as incorporated by reference in ARM 16.44.120 upon the request of the Department. The Permit and all conditions will also remain in effect beyond the expiration date if the Permittee has submitted a timely, complete application, but through no fault of the Permittee, a new Permit has not been issued.

I.F.4. Need to Halt or Reduce Activity Not a Defense

It shall not be a defense for the Permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this Permit.

I.F.5. Duty to Mitigate

In the event of noncompliance with the Permit, the Permittee shall take all reasonable steps to minimize releases to the environment and shall carry out such measures as are reasonable to prevent significant adverse impacts on human health or the environment.

I.F.6. Proper Operation and Maintenance

The Permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the Permittee to achieve compliance with the conditions of this Permit. Proper operation and maintenance includes effective performance, adequate funding, adequate operator staffing and training, and adequate laboratory and process controls, including appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facility or similar systems only when necessary to achieve compliance with the conditions of the Permit.

I.F.7. Duty to Provide Information

The Permittee shall furnish to the Department, within a reasonable time, any relevant information which the Department may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this Permit, or to determine compliance with this Permit. The Permittee shall also furnish to the Department, upon request, copies of records required to be kept by this Permit.

I.F.8. Inspection and Entry

The Permittee shall allow an authorized representative of the Department, upon the presentation of credentials, to:

I.F.8.a. Enter at reasonable times upon the Permittee's the premises where a regulated activity is located or conducted or where records must be kept under the conditions of this Permit;

I.F.8.b. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this Permit;

I.F.8.c. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this Permit; and

I.F.8.d. Sample or monitor, at reasonable times, for the purposes of assuring Permit compliance or as otherwise authorized by MHWUSTA, any substances or parameters at any location.

I.F.9. Monitoring and Records

I.F.9.a. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity. The method used to obtain a representative sample of the wastes to be analyzed must be the appropriate method from Appendix I of 40 CFR Part 261 as incorporated by reference in ARM 14.44.351. Laboratory methods for wastes or other media must be those specified in Test Methods for Evaluating Solid Waste Physical/Chemical Methods, SW-846, (Third Edition, 1986); Standard Methods of Wastewater Analysis, (Fifteen Edition, 1980); or an equivalent method as specified in this Permit.

I.F.9.b. The Permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports and records required by this Permit, and records of all data used to compete the application for this Permit for a period of at least 3 years from the date of the sample, measurement, report, record, certification, or application. These periods may be extended by request of the Department at any time and are automatically extended during the course of any unresolved enforcement action regarding this facility. The Permittee shall maintain records from all groundwater monitoring wells and associated groundwater surface elevations for the post-closure care period of the facility. The Permittee shall notify the Department in writing 30 days prior to destroying any records.

I.F.9.c. Records of monitoring information shall specify:

I.F.9.c.i. The dates, exact place, and times of sampling or measurements;

I.F.9.c.ii. The individuals who performed the sampling or measurements;

I.F.9.c.iii. The dates analyses were performed;

I.F.9.c.iv. The individuals who performed the analyses;

I.F.9.c.v. The analytical techniques or methods used; and

I.F.9.c.vi. The results of such analyses.

I.F.10. Reporting Planned Changes

The Permittee shall give notice to the Department as soon as possible of any planned physical alterations or additions to the Permitted facility.

I.F.11. Reporting Anticipated Noncompliance

The Permittee shall give advance notice to the Department of any planned changes in the permitted facility which may result in noncompliance with Permit requirements.

I.F.12. Transfer of Permits

This Permit may be transferred to a new owner or operator only if it is modified or revoked and reissued under ARM 16.44.115 or ARM 16.44.116 or a minor modification under ARM 16.44.117 is made, to identify the new Permittee and incorporate such other requirements as may be necessary under MHWUSTA. Before transferring ownership of the facility, the Permittee shall notify the new owner or operator in writing of the requirements of this Permit. Should Cenex transfer the land treatment unit to a new owner, the new owner shall become the Permittee.

I.F.13. Twenty-Four Hour Reporting

I.F.13.a. The Permittee shall report to the Department any noncompliance which may endanger health or the environment. Any such information shall be reported orally within 24 hours from the time the Permittee becomes aware of the circumstances. The report shall include the following:

I.F.13.a.i. Information concerning release of any hazardous waste that may cause an endangerment to public drinking water supplies; and

I.F.13.a.ii. Any information of a release or discharge of hazardous waste, or of a fire or explosion from the hazardous waste management facility which could threaten the environment or human health outside the facility.

I.F.13.b. The description of the occurrence and its cause shall include:

I.F.13.b.i. Name, address, and telephone number of the owner or operator;

I.F.13.b.ii. Name, address, and telephone of the facility;

I.F.13.b.iii. Date, time, and type of incident;

I.F.13.b.iv. Name and quantity of materials involved;

I.F.13.b.v. The extent of injuries, if any;

I.F.13.b.vi. An assessment of actual or potential hazards to the environment and human health outside the facility, where this is applicable; and

I.F.13.b.vii. Estimated quantity and disposition of recovered material that resulted from the incident.

I.F.13.c. A written submission shall also be provided within 5 days of the time the Permittee becomes aware of the circumstances. The written submission shall contain a description of the noncompliance and its cause; the periods

of noncompliance (including exact dates and times); whether the noncompliance has been corrected; and if not, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent recurrences of the noncompliance. The Permittee need not comply with the five-day written notice requirement if the Department waives the requirement, and the Permittee submits a written report within fifteen days of the time the Permittee becomes aware of the circumstances.

I.F.14. Other Noncompliance

The Permittee shall report all other instances of noncompliance not otherwise required to be reported above, at the time monitoring reports, as required by this Permit, are submitted. The reports shall contain the information listed in Condition I.F.13.a. and I.F.13.b.

I.F.15. Other Information

Whenever the Permittee becomes aware that he or she failed to submit any relevant facts in the permit application or submitted incorrect information in a permit application or in any report to the Department, the Permittee shall promptly submit such facts or information.

I.G. SIGNATORY REQUIREMENT

All reports or other information requested by the Department or required by this Permit shall be signed and certified as required by ARM 16.44.108.

I.H. DOCUMENTS TO BE MAINTAINED AT THE FACILITY SITE

The Permittee shall maintain at the facility, for the duration of the closure and post-closure period, the following documents and amendments, revisions, and modification to these documents:

I.H.1. The post-closure permit application as required by this Permit;

I.H.2. Post-closure cost estimate, updated annually, as required by ARM 16.44.805;

I.H.3. Closure and post-closure monitoring records, to include groundwater monitoring records and analytical results, as required by this Permit;

I.H.4. The closure plan as required by this Permit until closure is certified;

I.H.5. Cost estimate for facility closure as required by ARM 16.44.804 until closure is certified;

I.H.6. Certification of closure as required by ARM 16.44.702 upon completion of closure;

I.H.7. Personnel training documents and records as required by ARM 16.44.702 and this Permit;

I.H.8. Contingency plan as required by ARM 16.44.702 and this Permit;

I.H.9. Inspection schedules as required by ARM 16.44.702 and this Permit;

I.H.10. All records required to be submitted as a condition of this Permit; and

I.H.11. All applicable portions of the operating record requirements of ARM 16.44.702 and 40 CFR 264.73.

I.I. CONFIDENTIAL INFORMATION

I. The Permittee may claim confidential any information required to be submitted by this Permit in accordance with ARM 16.44.1008.

MODULE II - GENERAL FACILITY STANDARDS

II.A. PERMITTED UNIT

The Permittee is allowed to close, monitor, and provide post-closure care for the following unit. Location of the unit is shown in Attachment II.1.

Land Treatment Unit located in the southwest quarter of Section 16, Township 2 South, Range 24 East.

II.B. INCORPORATION BY REFERENCE

The technical facility standards of 40 CFR 264 are incorporated by reference in ARM 16.44.702.

II.C. SAMPLING, MONITORING, AND ANALYSIS

The Permittee shall follow the sampling and analysis procedures and schedules described in Modules III, IV, and V of this Permit.

II.D. SECURITY

The Permittee shall comply with the following security conditions:

II.D.1. A 24-hour surveillance system which continuously monitors and controls entry onto the land treatment unit; or

II.D.2. An artificial or natural barrier which completely surrounds the active portion of the facility; and

II.D.3. A means to control entry, at all times, through the gates or other entrances, to the land treatment unit.

II.D.4. A sign with the legend, "Danger-Unauthorized Personnel Keep Out", must be posted at each entry to the land treatment unit, and at other locations, in sufficient numbers to be seen from any approach to the unit. The signs must legible from a distance of at least 25 feet.

II.E. GENERAL INSPECTION REQUIREMENTS

The Permittee shall follow the inspection schedule set out in Permit Attachment II.2. with the following additions:

II.E.1. The Permittee shall develop an inspection schedule and log form for the closure period of the unit. The schedule and log form shall be submitted to the

Department with thirty days of the effective date of this Permit. Closure inspections shall be conducted on a monthly basis. Upon approval by the Department, the closure inspection schedule and log form shall become a part of this Permit.

II.E.2. Post-closure inspections shall be conducted on a monthly basis for the first two years of post-closure care and on a quarterly basis thereafter. Inspections shall include checking to see that monitoring wells are capped and locked.

II.E.3. Inspections during the closure and post-closure period shall be conducted at the frequency given above and after each storm event in which the equivalent of one-quarter inch of precipitation has fallen.

II.E.4. The Permittee shall remedy any deterioration or malfunction of equipment or structures which the inspection reveals on a schedule which ensures that the problem does not lead to an environmental or human health hazard. Where a hazard is imminent or has already occurred, remedial action must be taken immediately.

II.E.5. The Permittee must record inspections in an inspection log or summary. These records must be kept for at least three years from the date of inspection and must include the date and time of the inspection, the name of the inspector, a notation of the observations made, and date and nature of any repairs or other remedial actions.

II.F. PERSONNEL TRAINING

The Permittee shall conduct personnel training as required by 40 CFR 264.16. This training program shall follow the conditions outlined in Attachment II.3. The Permittee shall maintain training documents and records as required by 40 CFR 264.16(d) and (e).

II.G. LOCATION STANDARDS

Any hazardous waste management unit or portion of a unit located in a 100-year floodplain must be designed, constructed, operated, and maintained to prevent washout of any hazardous waste by a 100-year flood.

II.H. PREPAREDNESS AND PREVENTION

II.H.1. Required Equipment

At a minimum, the Permittee shall maintain at the facility the equipment set forth in the Preparedness and Prevention Plan, Permit Attachment II.4, as required by 40 CFR 264.32.

II.H.2. Testing and Maintenance of Equipment

The Permittee shall test and maintain the equipment specified in Permit Condition II.H.1., as necessary, to assure its proper operation in time of emergency, as required by 40 CFR 264.33.

II.H.3. Access to Communications or Alarm System

The Permittee shall maintain access to the communications or alarm system, as required by 40 CFR 264.43.

II.H.4. Arrangements with Local Authorities

The Permittee shall maintain arrangements with state and local authorities, as required by 40 CFR 264.37. If state or local officials refuse to enter into preparedness and prevention arrangements with the Permittee, the Permittee must document this refusal in the operating record.

II.I. CONTINGENCY PLAN

II.I.1. Implementation of Plan

The Permittee shall immediately carry out the provisions of the Contingency Plan, Permit Attachment II.5, whenever there is a fire, explosion, or release of hazardous waste or constituents which could threaten human health or the environment.

II.I.2. Copies of Plan

The Permittee shall comply with the requirements of 40 CFR 264.53.

II.I.3. Amendments to Plan

The Permittee shall review and immediately amend, if necessary, the Contingency Plan, as required by 40 CFR 264.54.

II.I.4. Emergency Coordinator

A trained emergency coordinator shall be available at all times in case of an emergency as required by 40 CFR 264.55. The names, addresses, and phone numbers of all persons qualified to act as emergency coordinators shall be supplied to the Department in accordance with Condition II.I.6.

II.I.5. Reporting

The Permittee shall include reports on all events which require implementation of the contingency plan in the operating record including a description of how the

plan was implemented and what actions were taken.

II.I.6. Updated Plan

Within thirty days of the effective date of this Permit, the Permittee shall submit an updated Contingency Plan to the Department which shall be incorporated into this Permit upon Department approval. The updated plan shall include:

II.I.6.a. Name of the current primary emergency coordinator and phone number; and

II.I.6.b. Revised Table 2.1 with correct phone numbers and deletion of the RCRA hotline number; and

II.I.6.c. Correct Section 4.3 to eliminate references of applying spilled material to the land treatment unit.

II.J. RECORDKEEPING AND REPORTING

In addition to the recordkeeping and reporting requirements specified elsewhere in this Permit, the Permittee shall do the following:

II.J.1. Operating Record

The Permittee shall maintain a written operating record at the facility, in accordance with 40 CFR 264.73.

II.J.2. The Permittee shall comply with the annual reporting requirements of ARM 16.44.417(2).

ATTACHMENTS - MODULE II

Attachment II.1: Location of the Land Treatment Unit

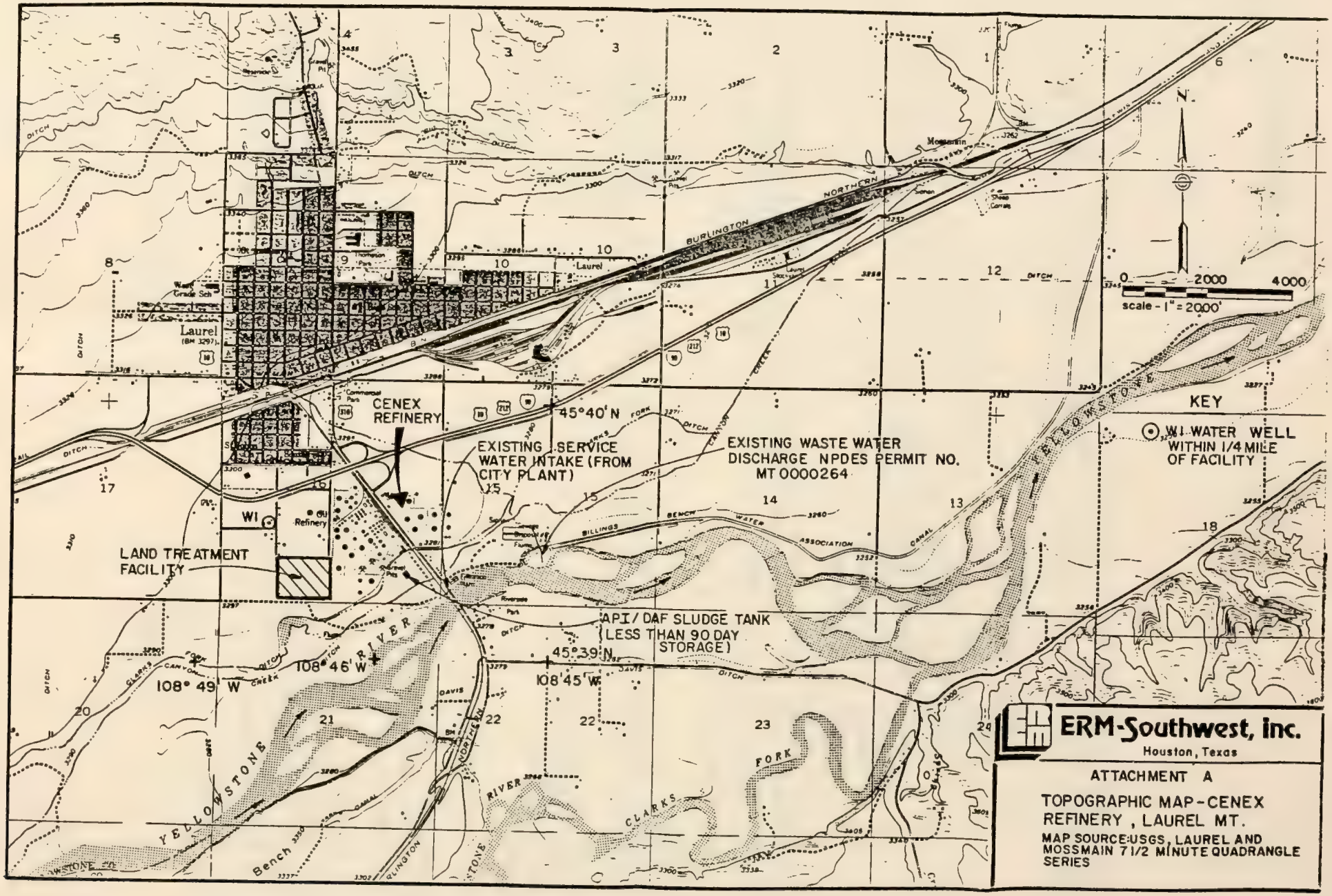
Attachment II.2: Inspection Schedule

Attachment II.3: Personnel Training Plan

Attachment II.4: Preparedness and Prevention Plan

Attachment II.5: Contingency Plan

ATTACHMENT II.1



ERM-Southwest, inc.
Houston, Texas

ATTACHMENT A

TOPOGRAPHIC MAP - CENEX REFINERY, LAUREL MT.

MAP SOURCE: USGS, LAUREL AND MOSSMAIN 7 1/2 MINUTE QUADRANGLE SERIES

4 - POST-CLOSURE PLAN

4.1 General

The post-closure plan for the landfarm will cover a period of 30 years. During the post-closure period, requirements are in effect for preservation of integrity of the closure system, monitoring of the system, and maintenance. The post-closure plan must be amended as necessary to reflect current practices and requirements.

The post-closure care period will begin when Phase II of the closure plan has been completed, approximately 6 months to 2 years after the final waste placement.

The probable post-closure operator will be:

CENEX
P.O. Box 909
Laurel, Montana 59044
Tel: 406-628-4311

The name, phone number and address of the post-closure operator will be determined and entered in to the plan at the time of closure.

4.2 Inspection Schedule

In order to maintain the integrity of the vegetative cover, monitoring wells, run-on and run-off control measures, and security, the following items will be checked on a quarterly basis.

- check for erosion
- check for ponding of water
- check for vegetative cover
- check surface drainage ditches for debris and clogging
- check above-grade portion of monitoring wells for structural integrity
- check berms for signs of deterioration
- inspect fencing
- inspect benchmarks

The inspection log for the above activities is shown in Table 4-1. This log will also be used for recording maintenance activities performed based on these inspections.

U577
Page 1 of 2

TABLE 4-1

Post Closure Inspection Report

CLOSURE: NLF Treatment Area

WEATHER CONDITIONS: _____

INSPECTION DATE: _____

TIME START: _____

INSPECTOR: _____

SUPERVISOR APPR: _____ DATE: _____

NO.	INSPECTION ITEM	CHECK LIST	PASS	FIX	REMEDIAL ACTION	DATE FIXED	PROCEDURE AND AMT. OF MAT'L. USED	REINSPECT. AND DATE
1	Visual inspection	1a. Grass cover 1b. Ponded water 1c. Surface depressions			-Approved Topsoil Fill -Fertilize -Seed			
2	Excessive erosion	2a. Eroded soil 2b. Barren areas			-Approved Topsoil Fill -Fertilize -Seed			
3	Vegetative growth (March - November)	3a. Barren areas 3b. Miscolored leaves 3c. Excessive moisture in soil			3a. Revegetate 3b. Soil analysis Add fertilizer if necessary or adjust soil pH 3c. Improve drainage			
4	Drainage ditches	4a. Soil and debris build up			4a. Clean ditch			
5	Monitor wells	5a. Check above-ground structural integrity			5a. Repair above ground without replacing entire well 5b. If problem is below grade, replace entire well			

COMMENTS _____

ATTACHMENT II.2

TABLE 4-1

Post Closure Inspection Report

CLOSURE: NLF Treatment Area

WEATHER CONDITIONS: _____

INSPECTION DATE: _____

TIME START: _____

INSPECTOR: _____

SUPERVISOR APPR: _____ DATE: _____

NO.	INSPECTION ITEM	CHECK LIST	PASS	FIX	REMEDIAL ACTION	DATE FIXED	PROCEDURE AND AMT. OF MAT'L. USED	REINSPECT. AND DATE
6	Fencing	6a. Check for holes and deterioration in wire fabric			6a. Replace as needed			
7	Run-on and Run-off Berms	7a. Check for deterioration			7a. Replace and compact material as needed Fertilize and seed.			
8	Benchmarks	8a. Check for signs of disturbance			8a. Resurvey as needed.			

COMMENTS _____

ATTACHMENT II.2

6 - PERSONNEL TRAINING

6.1 Introduction

This plan documents the training required of personnel responsible for operation, inspection, monitoring, and maintenance of the hazardous waste landfarm facility throughout the closure and post-closure periods.

Classroom instruction and on-the-job training directed by the hazardous waste manager at CENEX's Laurel, Montana refinery is required of personnel closing the landfarm. This program is designed to enable them to operate these facilities properly and respond effectively to emergencies.

The training course defined in this plan is given to new operators (transferred or new employees) and is also reviewed annually (refresher course) with all personnel involved in the operation of the landfarm facility. This annual review also allows for the review of any changes to the various RCRA plans of which the operators should be aware. Records kept by the hazardous waste manager until closure of the hazardous waste facilities, as required by regulation, include job titles, qualifications and responsibilities, training programs and continuing hazardous waste education.

6.2 Training Course Outline

The following is an outline of the subjects covered by the hazardous waste training program at CENEX's Laurel, Montana refinery:

- RCRA Overview
- Hazardous Waste-General
- Hazardous Waste Applied to Landfarm
- Landfarm Operations and Training
- Post-Closure Inspection and Maintenance
- Contingency Plan.

This training will be in addition to other regular health and safety training that is provided at the Cenex facility.

6.3 Training Frequency

Facility personnel must successfully complete the training program within six months of assignment to the jobs related to the landfarm closure. Employees do not work in unsupervised positions until they have completed the training requirements. Facility personnel take part in an annual training review.

6.4 Training Records

Training records are kept on file at the refinery in the office of the Support Systems Engineer. These records are maintained until closure for current personnel and for three years from the date a former employee (whether transferred or terminated) last worked at the landfarm facility.

6.5 Summary

The Training Program outlined above is the means by which comprehensive, up-to-date information concerning all of the landfarm operations are conveyed to all personnel working in these areas. This allows for the proper operation of the facilities and the minimization of the effect of emergency situations. The program is designed to ensure that facility personnel are able to respond effectively to emergencies by familiarizing them with emergency procedures, emergency equipment, and emergency systems.

RCRA

PREPAREDNESS AND PREVENTION PLAN

FOR

Farmers Union Central Exchange, Inc.
(CENEX)

Laurel, Montana Refinery

Revised October, 1985

TABLE OF CONTENTS

Section		Page
1	INTRODUCTION	1
2	POTENTIAL EMERGENCIES	1
3	REQUIRED EMERGENCY EQUIPMENT	1
	3.1 Internal Communications and Alarms	1
	3.2 Cenex Emergency Equipment	2
	3.3 External Emergency Equipment and Services	4
4	TESTING AND MAINTENANCE OF EQUIPMENT	4
5	ACCESS TO COMMUNICATIONS	6
6	REQUIRED AISLE SPACE	6
7	ARRANGEMENTS WITH LOCAL AUTHORITIES	6

1. INTRODUCTION

This preparedness and prevention plan contains information necessary to operate and maintain the emergency equipment associated with the hazardous waste treatment/storage/disposal sites at CENEX's Laurel, Montana refinery. Specifically, this plan contains the following information:

1. Potential emergencies.
2. Required emergency equipment.
3. Testing and maintenance of emergency equipment.
4. Access to communications.
5. Required aisle space.
6. Arrangements with local authorities.

2. POTENTIAL EMERGENCIES

Emergency situations are defined as those that could possibly result in an unplanned sudden or non-sudden release of hazardous waste or hazardous waste constituents to air, soil, or surface water which could threaten human health or the environment. Possible emergency situations at the CENEX's hazardous waste facilities are:

Hazardous Waste Facility	Possible Emergency
Sludge Tank (wastewater pretreatment area)	Tank Rupture Fire
Landfarm	Fire Leaching of hazardous waste constituents to the ground water.

3. REQUIRED EMERGENCY EQUIPMENT

3.1 Internal Communications and Alarms

Portable two way radios are utilized by refinery operations personnel and can be used to notify the safety department in case of hazardous waste emergency at the landfarm or

wastewater pretreatment area. There is also a high level alarm which indicates to personnel in the alkylation control unit, adjacent to the wastewater pretreatment area, of a possible high liquid level in the sludge tank. Once alerted of this condition, corrective measures can be taken.

3.2 Cenex Emergency Equipment

Table 3.1 lists the equipment available at the CENEX refinery in case of an emergency:

TABLE 3.1

CENEX EMERGENCY EQUIPMENT

1. Two fire trucks with dual water and Foam capabilities. Located at Cenex fire house.

2. Two 1200 gallon vacuum trucks, located in Refinery garage.

3. The CENEX refinery has 62 fire hydrants dispersed throughout the refinery. The relationship between fire hydrant location and the hazardous waste facilities is shown in Figure 3-1. Firewater is supplied by the City of Laurel and is capable of producing 10,000 gpm at 80-90 psi. This volume and pressure would be adequate to effectively control fires in the hazardous waste treatment/storage/and disposal areas within the refinery.

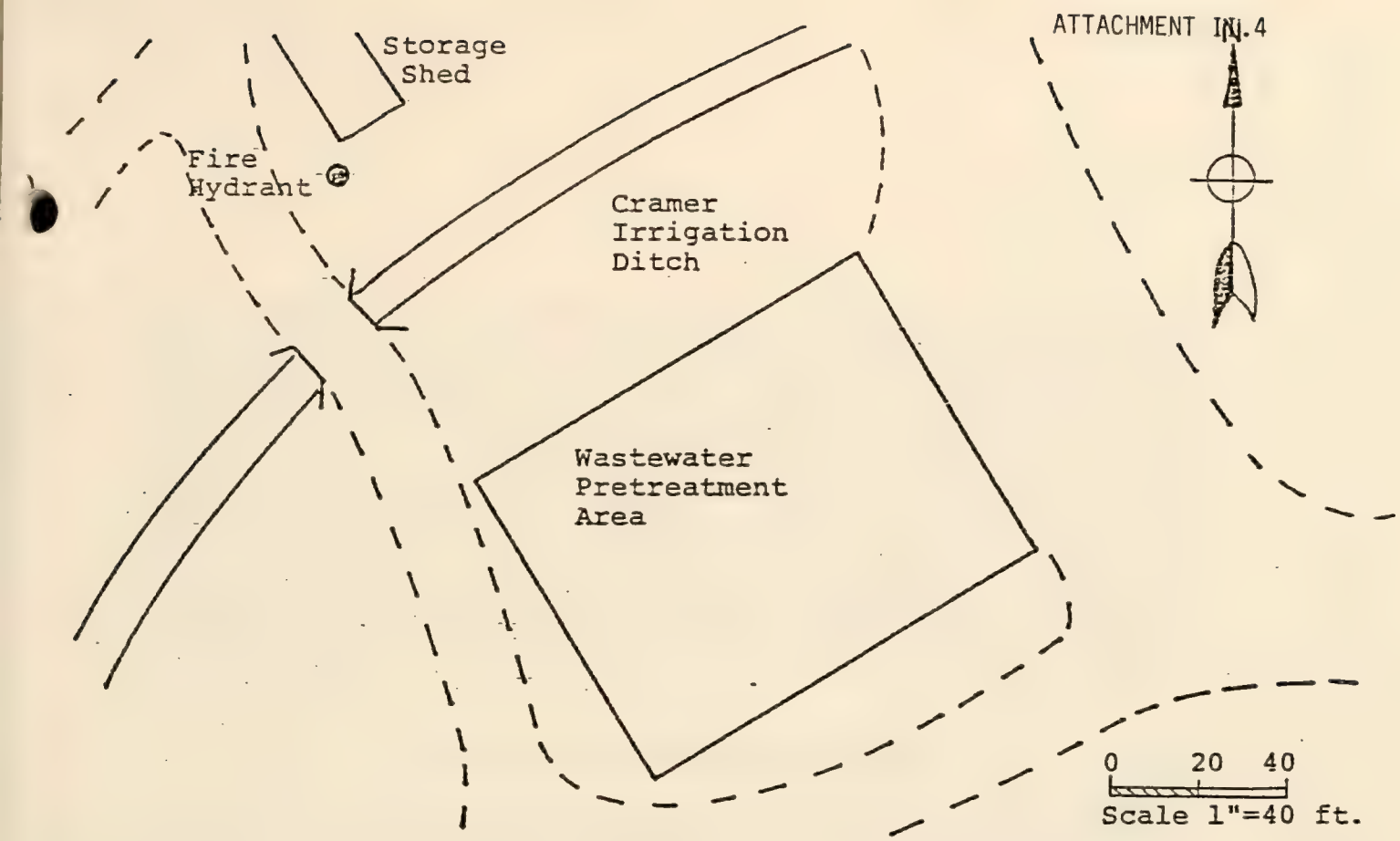
4. Two fire alarms (steam whistle, siren), located in boiler house and FCC unit.

5. Approximately 65 two-way radios, located throughout refinery.

6. One high level alarm at the wastewater pretreatment area.

7. There are over 200 dry chemical fire extinguishers located throughout the refinery which can be used for early stage fire fighting. In addition, there are a number of 150# and 350# wheeled units located strategically throughout the refinery.

8. Oil spill equipment including absorbent booms and pads are stored in Box 116.



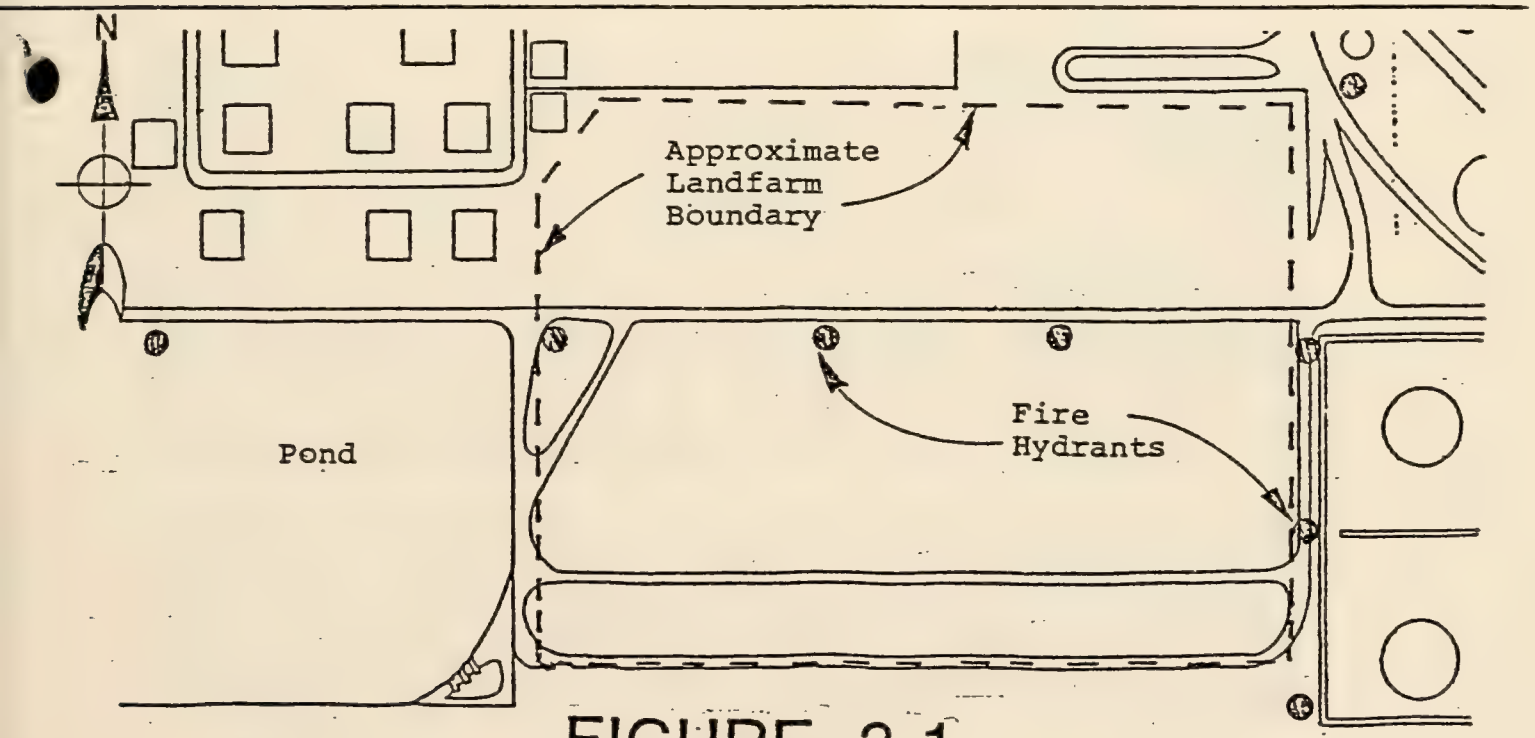


FIGURE 3.1
FIRE HYDRANT LOCATION NEAR HAZARDOUS WASTE FACILITIES

CENEX-LAUREL, MONTANA REFINERY

0 100 200 300 400 feet

SCALE

The emergency equipment listed above is capable of controlling potential emergencies at the hazardous waste facilities. The water/foam fire trucks, alarms, and fire hydrants throughout the refinery could effectively manage fires at the landfarm or the wastewater pretreatment area. Tank leakage or spills of hazardous materials could be quickly cleaned up by the vacuum trucks. The possibility of hazardous waste material leaching into the ground water (non-sudden release) is carefully monitored by seven (7) observation wells in the refinery. A specific schedule for sampling and analysis will allow detection of hazardous constituents leaching into the ground water. This is part of the RCRA plans for ground water and unsaturated zone sampling and analyses.

3.3 External Emergency Equipment and Services

The refinery has access to spill control equipment through the Montana-Wyoming Oil Control Coordination Committee as described in the Contingency Plan.

A mutual aid agreement has been established between three refineries in the Laurel-Billings Montana area and could be called upon to cope with emergencies or disaster situations that may arise at the CENEX Refinery. This plan utilizes the available protective facilities of the group for the benefit of all the industries of the agreement (CENEX, Conoco, Exxon U.S.A.) in case of extreme emergency. All equipment responding to such an emergency shall be accompanied by sufficient and qualified manpower to carry out the regular and emergency operation of such equipment. Any equipment, material, or manpower going into another plant immediately falls under the command of the emergency coordinator in charge of that plant when hazardous waste facilities are involved. See Contingency Plan for details.

A mutual aid agreement has been established between the City of Laurel, Montana and the CENEX Refinery regarding fire protection. This agreement makes the firefighting equipment of the City available to the CENEX Refinery in case of a major fire. All equipment entering the CENEX Refinery from the City of Laurel falls under the command of the Emergency Coordinator when hazardous waste facilities are involved.

4. TESTING AND MAINTENANCE OF EQUIPMENT

Table 4.1 lists maintenance and testing schedules for the emergency equipment at CENEX's Laurel, Montana refinery. These tests have been formulated to assure proper operation of the equipment if such service is needed.

TABLE 4.1

MAINTENANCE/TESTING SCHEDULE FOR EMERGENCY EQUIPMENT

	Frequency	Emergency Equipment	Description
1.	1 Truck/month	Fire trucks	Truck maintenance check Truck exercise
2.	1 Truck/month	Vacuum trucks	Check truck for normal operation, check vacuum tank for normal operation
3.	Intermittent	Fire pumps/ hydrants	Periodic Flow testing is done at least once per year
4.	Weekly	Alarm System	Noon Whistle Check (steam and siren)
5.	Weekly	Portable two way radios	Check that transmissions are understandable
6.	Once/week	Sludge Tank Secondary containment high level alarm	A high level is simulated
7.	Once/month	Fire extinguishers	Inspected once each month and maintenance is done annually
8.	None Required	Oil Absorbent Material	
9.	Twice/year	Ground water Monitoring wells	RCRA Sampling

5. ACCESS TO COMMUNICATIONS

Employees have access to the plant portable two way radios.

6. REQUIRED AISLE SPACE

Access to all of the hazardous waste facilities at CENEX's Laurel, Montana Refinery is via in-plant roadways. Vehicles or equipment are not allowed to be placed stationary in a road unless other means of egress are available. Thus, all emergency equipment would have access to the hazardous waste facilities at the CENEX Refinery in response to an emergency.

7. ARRANGEMENTS WITH LOCAL AUTHORITIES

The mutual aid agreement with the City of Laurel Fire Department is given in detail in the Contingency Plan. The Laurel Fire Department personnel have received training within the refinery which would familiarize them with the layout of the refinery, entrances to roads inside the refinery and possible evacuation routes.

The mutual aid agreement between CENEX, Conoco, and Exxon is given in detail in the Contingency Plan. Conoco, Exxon, and CENEX personnel have received training within the CENEX refinery which would familiarize them with the layout of the refinery, entrances to roads inside the refinery and possible evacuation routes. They are familiar with the properties of hazardous waste handled at the refinery and associated hazards, since all three refineries have similar wastes.

The local hospitals and Laurel Clinic are familiar with the type of injuries which could result from fires or releases at the refinery. The CENEX Chemical Data Book contains health hazard data, emergency and first aid procedures and emergency phone numbers for chemicals used at the refinery.

RCRA
CONTINGENCY PLAN AND EMERGENCY PROCEDURES
for
Farmers Union Central Exchange, Inc.
(CENEX)
Laurel, Montana Refinery
Revised October, 1985

TABLE OF CONTENTS

Section		Page
1	INTRODUCTION	1
	1.1 Background	1
	1.2 Scope and Objectives	1
2	EMERGENCY COORDINATOR	2
	2.1 List of Emergency Coordinators	2
	2.2 Duties of Emergency Coordinator	3
	2.3 Authority of Emergency Coordinator	7
	2.4 Hazardous Waste Records	7
3	POST INCIDENT REPORTING AND RECORDKEEPING	7
4	EMERGENCY PROCEDURES	8
	4.1 General	8
	4.2 Communication	8
	4.3 Decontamination	8
5	EMERGENCY AGREEMENTS	8
6	EMERGENCY EQUIPMENT	10
7	EVACUATION PLAN	10
8	COPIES OF CONTINGENCY PLAN	10
9	AMENDMENT OF CONTINGENCY PLAN	10

APPENDICES:

APPENDIX A: Mutual Aid Call Procedures
APPENDIX B: Agreement for Mutual Aid in Fire Protection
APPENDIX C: Cenex, Conoco, and Exxon Mutual Aid Agreement
APPENDIX D: Agreement for Oil Spill Cooperative
APPENDIX E: Employee Emergency Action Plan and Fire Prevention Manual

1. INTRODUCTION

1.1 Background

This plan describes an organized course of action to be taken in response to any anticipated hazardous waste emergencies at CENEX's Laurel, Montana Refinery.

This plan is written to meet the regulatory requirements of the United States Environmental Protection Agency and the Montana Department of Health and Environmental Sciences pursuant to implementing control of hazardous waste treatment, storage and disposal practices under the Resource Conservation and Recovery Act (RCRA). The specific contingency plan and emergency procedure regulations are given in 40 CFR 264 Subpart D.

1.2 Scope and Objectives

The Contingency Plan and Emergency Procedures are designed to minimize hazards to human health or the environment from fires, explosions, or any unplanned sudden or non-sudden release of hazardous waste or hazardous waste constituents to air, soil or surface water. The provisions of the Plan are to be carried out immediately whenever there is a fire, explosion, or release of hazardous waste or hazardous waste constituents which could threaten human health or the environment.

The Contingency Plan and Emergency Procedures describe specific actions to be taken in response to fires, explosions, or any unplanned sudden or non-sudden release of hazardous waste constituents to air, soil or surface water which could threaten human health or the environment. The plan describes arrangements with local emergency agencies or contractors, lists emergency personnel, catalogs emergency equipment, and includes an evacuation plan. The EPA has further stated in the May 19, 1980 Federal register that contingency plans should not encroach OSHA responsibilities and should not include planning and response to ground water contamination incidents.

The CENEX Employee Emergency Action Plan and Fire Prevention Manual describes provisions that have been made to deal with or prevent emergencies in the refinery. These plans are included in the Appendices to this plan. The Contingency Plan is available for review in the office of the Support Systems Engineer, and will be submitted with current

revisions to the local fire department and members of the Mutual Aid Agreement. The specific requirements of 40 CFR 264 Subpart D are addressed in this Contingency Plan.

The contingency plan includes the following facilities at the CENEX Refinery:

a. Sludge tank wastewater pretreatment area

b. Landfarm

2. EMERGENCY COORDINATOR

2.1 List of Emergency Coordinators

Current plan policy for fires or spills assigns immediate emergency coordinator authority to the Shift Foreman, who will then contact the Primary Emergency Coordinator. In the event the designated Primary Emergency Coordinator is unavailable, the Alternate Emergency Coordinators are to be contacted. When the Primary Emergency Coordinator or Alternate is contacted and is at the refinery, he will assume the responsibilities of emergency coordinator. This practice includes all hazardous waste emergencies.

Emergency Coordinator	Title	Address	Work Phone (406) 628-4311 (Extension)	Home Phone
Immediate Emergency Coordinators				
S. Walton	Shift Foreman	815 6th Ave. Laurel, MT	231	628-6925
K. Peterson	Shift Foreman	2720 Cook Ave. Billings, MT	231	656-0549
H. Mohr	Shift Foreman	412 12th St. Laurel, MT	231	628-4913
E. Steffans	Shift Foreman	316 Laurmac Ln. Laurel, MT	231	628-6958
L. Yeager	Shift Foreman	902 5th Ave. Laurel, MT	231	628-8095
R. Frank	Shift Foreman	Rt. 1, Box 146 Laurel, MT	231	628-4029

2. Whenever there is an imminent or actual emergency situation the Emergency Coordinator must notify appropriate State or local agencies or mutual aid partners if their assistance is needed. Table 2.1 is a list or organizations that can be contacted (also see appendices).

3. Whenever there is an actual hazardous waste emergency - a release, fire or explosion - the emergency coordinator must immediately identify the character, exact source, amount, and areal extent of any released materials. He may do this by observation or review of facility records of manifests, and if necessary, by chemical analysis.

4. As an emergency develops, the Emergency Coordinator must assess possible hazards to human health or the environment. This assessment must consider both direct and indirect effects of the release, fire or explosion (e.g. the effects of any toxic, irritating, or asphyxiating gases that are generated, or the effects of any hazardous surface water run-off from water or chemical agents used to control fire and heat-induced explosions).

5. If the Emergency Coordinator determines that the emergency could threaten human health or the environment outside the facility, he must execute the Emergency Notification Checklist (Figure 2-1) and if his assessment indicates that evacuation of local areas may be advisable, he must immediately notify appropriate local authorities. He must be available to help appropriate officials decide whether local areas should be evacuated.

6. During an emergency, the Emergency Coordinator must take all reasonable measures necessary to ensure that fires, explosions, and releases do not occur, reoccur, or spread to other hazardous waste at the facility. These measures must include, where applicable, stopping processes and operations, collecting and containing released waste, and removing or isolating containers.

7. If the hazardous waste facilities are shut down in response to an emergency, the Emergency Coordinator must monitor for leaks, pressure buildup, gas generation, or ruptures in valves, pipes, or other equipment, whenever this is appropriate.

TABLE 2.1

EMERGENCY CONTACTS

EPA Regional Response Center	800-424-8802
EPA RCRA Hotline	800-424-9346
State Disaster and Emergency Service Division	406-444-6911
Laurel Police	911
Laurel Fire Department	628-8737
Laurel Ambulance	911
Laurel Clinic	628-6311
County Sheriff Department	252-0588
State Highway Patrol Division Office	245-6193
State Highway Patrol Division Office	252-0588
Continental Refinery Daytime	252-3841
Night Foreman	252-1146
Lab After Hours	252-4695
Exxon Refinery	248-2161
Security Agency Lt. Steve Piccioni	252-4971
Pinkertons-Denver	303-759-2626
US EPA, Region VIII-Helena	449-5414
Montana Solid and Hazardous Waste Bureau	444-2821
Montana Water Quality Bureau-Helena	449-2406
Montana Air Quality Bureau-Helena	444-3454
Chemtrec	800-424-9300

Also see Appendices to the Contingency Plan

Figure 2-1

Hazardous Waste Emergency Notification Checklist)

At the outset of an emergency, in the unlikely event that possible hazards to human health or the environment can occur outside the facility, contact EPA's Regional Response Center (800) 424-8802 and the State's Disaster and Emergency Service Division (406) 449-3034 with the following information.

1. FACILITY

Farmers Union Central Exchange, Inc.
P. O. Box 909
CENEX Refinery
Laurel, Montana 59044
Phone: (406) 628-4311

2. EMERGENCY COORDINATOR

Name:
Phone Number:

3. REPORTER

Name:
Phone Number:

4. INCIDENT

Date, Time:
Weather Conditions:
Type (fire, explosion, sudden or non-sudden release to air, soil or surface waters):

5. MATERIALS

Name:
Quantities:

6. INJURIES

Extent:

7. HAZARDS

To Human Health:

To Environment:

8. Immediately after an emergency, the Emergency Coordinator must provide for proper treatment, storage, or disposal of recovered waste, contaminated soil or surface water, or any other material that results from a release, fire, or explosion at the facility.

9. The Emergency Coordinator must ensure that in the affected areas of the facility that no waste that may be incompatible with the released material is treated, stored, or disposed of until cleanup procedures are completed.

10. The Emergency Coordinator must ensure that all emergency equipment listed in the Contingency Plan is cleaned and fit for its intended use before operations are resumed.

2.3 Authority of the Emergency Coordinator

The Emergency Coordinator has the authority to commit the resources needed to carry out the contingency plan and emergency procedures. The Emergency Coordinator has the authority to shut down and restart production facilities and evacuate plant personnel.

2.4 Hazardous Waste Records

Records relating to hazardous waste and hazardous waste emergencies are maintained by the Support Systems Engineer and are filed in the office of the Support Systems Engineer. The records are available at all times to the Emergency Coordinator.

3. POST INCIDENT REPORTING AND RECORD KEEPING

The owner or operator must notify the Regional Administrator and the State Solid Waste Management Bureau that he has complied with 2.2.9 and 2.2.10 under Duties of Emergency Coordinator before operations are resumed in the affected area (s) of the facility.

The owner or operator must note in the facility operating record the time, date, and details of any incident that requires implementing the Contingency Plan. Within 15 days after the incident, he must submit a written report on the incident to the Regional Administrator and the State Solid Waste Management Bureau. In addition to the information

required in the Hazardous Waste Emergency Notification Checklist (Figure 2-1) the report must include an assessment of actual or potential hazards to human health or the environment and the estimated quantity and disposition of recovered material that resulted from the incident.

4. EMERGENCY PROCEDURES

4.1 General

The EPA refers to a hazardous waste emergency as a "fire, explosion, sudden or non-sudden release to air, soil or surface waters". Potential events at the hazardous waste facilities which meet this definition are:

1. Fire or tank rupture and leakage in wastewater pretreatment area (sludge tank).

2. Fire within the landfarm area or leaching of hazardous waste constituents into the ground water in the landfarm area.

Table 4-1 is a procedure guide for handling these potential emergencies. The CENEX Employee Emergency Action Plan and Fire Prevention Manual describes additional emergency response actions.

4.2 Communication

Portable two way radios are utilized by refinery operations personnel and can be used to notify the shift foreman in case of a hazardous waste emergency. Phones located in most control buildings can also be used to notify the shift foreman of an emergency.

4.3 Decontamination

All spills in the wastewater pretreatment area would be confined within existing cement structures. A vacuum truck would be called upon to remove the hazardous materials and apply them to the landfarm. Accidental spills of hazardous materials out of the vacuum truck would require excavation and application of contaminated soils onto the landfarm.

5. EMERGENCY AGREEMENTS

The CENEX Refinery has mutual aid agreements with Conoco, Exxon and the Laurel Fire Department as described in the

TABLE 4-1

HAZARDOUS WASTE FACILITIES

Emergency	Detection	Procedure Guide
Fire in sludge tank at wastewater pretreatment area.	Witness flames	Report to shift foreman, confine fire, treat and clean up, file report.
Sudden release of untreated wastewater and sludges to area surrounding tankage in pretreatment area.	Witness ponding or unusual flow within pretreatment area, tank rupture and leakage.	Report to shift foreman, isolate spill, confirm wastes in stream, confirm ruptured tanks, treat and clean up with vacuum truck, file report.
Spill occurs during transport of waste from sludge tank to landfarm.	Waste observed on ground along transportation route from sludge tank to landfarm.	Report to shift foreman, clean up with vacuum truck or backhoe, dispose of in landfarm, file report.
Fire in landfarm.	Witness flames.	Report to shift foreman, confine fire, confirm location and wastes involved, treat and clean up, file report.
Non-sudden release of contaminated landfarm leachate to surface water.	Unusual data from ground water wells indicating leachate release.	Report to Support Systems Engineer, define extent of problem, determine required containment measures via technical study (ground water assessment).

Preparedness and Prevention Plan. Copies of the agreements are in the Appendices to this Contingency Plan. In addition, the refinery has access to spill control equipment through the Montana-Wyoming Oil Control Coordination Committee. A copy of the agreement is in the Appendices to this Contingency Plan.

6. EMERGENCY EQUIPMENT

Table 6.1 lists the major emergency equipment available at the CENEX Refinery in case of an emergency. The CENEX Employee Emergency Action Plan and Fire Prevention Manual also lists emergency equipment with location and description when applicable. The refinery has access to additional emergency equipment through the agreements described in the previous section.

7. EVACUATION PLAN

The Refinery Evacuation Plan is included in the CENEX Employee Emergency Action Plan and Fire Prevention Manual. The Plan describes the signals to be used to begin evacuation, evacuation routes, and alternate evacuation routes.

8. COPIES OF CONTINGENCY PLAN

Copies of the Contingency Plan are maintained by the Support Systems Engineer and are kept in the office of the Support Systems Engineer.

9. AMENDMENT OF CONTINGENCY PLAN

The Contingency Plan will be reviewed and immediately amended if necessary, whenever:

a. Applicable regulations are revised.

b. The Plan fails in an emergency.

c. The facility changes - in its design, construction, operation, maintenance, or other circumstances - in a way that materially increases the potential for fires, explosions, or releases of hazardous waste or hazardous waste constituents, or changes the response necessary in an emergency.

d. The list of Emergency Coordinators changes.

e. The list of emergency equipment changes.

TABLE 6.1

CENEX EMERGENCY EQUIPMENT

1. Two fire trucks with dual water and Foam capabilities. Located at Cenex fire house.

2. Two 1200 gallon vacuum trucks, located in Refinery garage.

3. The CENEX refinery has 62 fire hydrants dispersed throughout the refinery. The relationship between fire hydrant location and the hazardous waste facilities is shown in Figure 6-1. Firewater is supplied by the City of Laurel and is capable of producing 10,000 gpm at 80-90 psi. This volume and pressure would be adequate to effectively control fires in the hazardous waste treatment/storage/and disposal areas within the refinery.

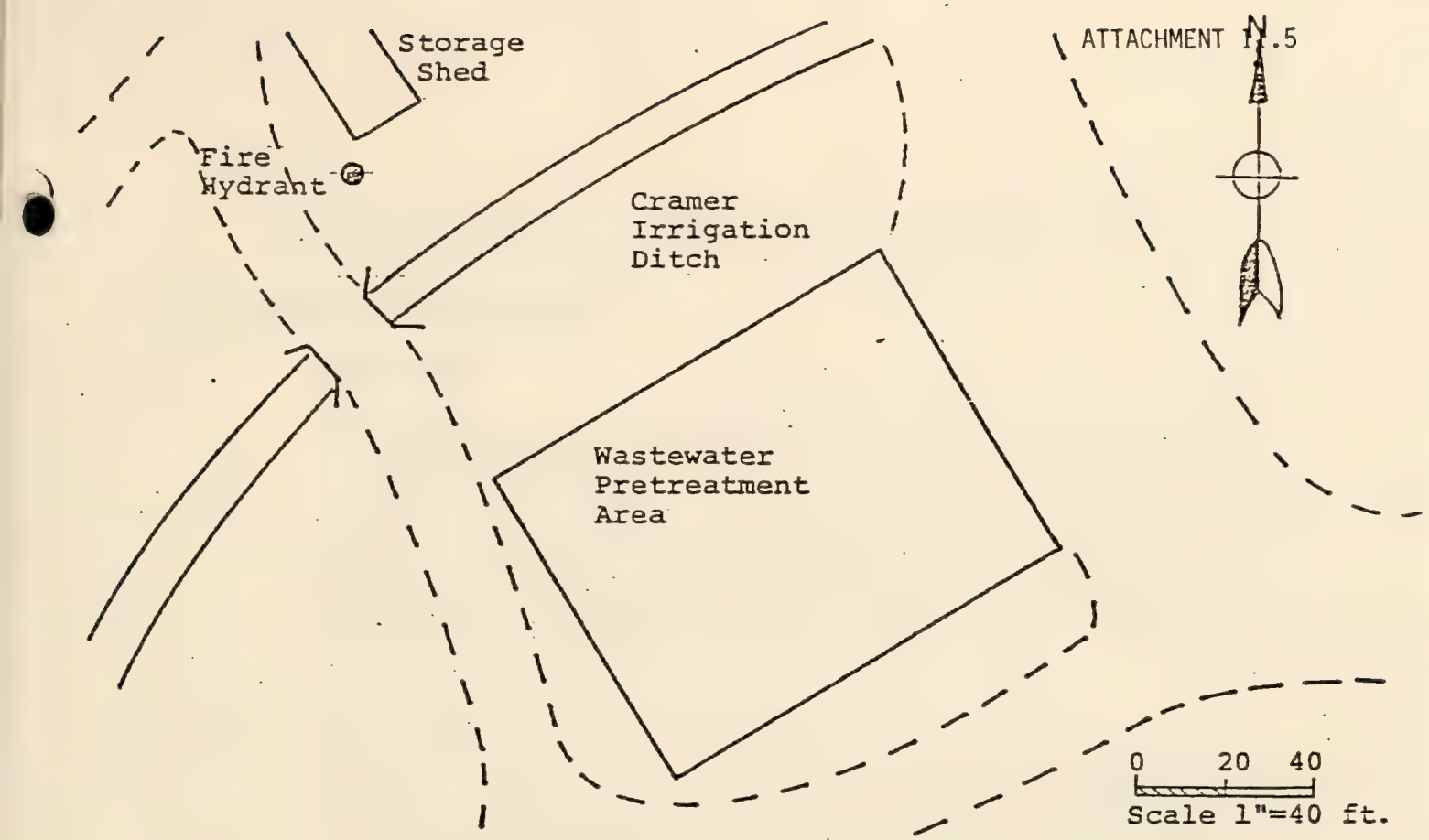
4. Two fire alarms (steam whistle, siren), located in boiler house and FCC unit.

5. Approximately 65 two-way radios, located throughout refinery.

6. One high level alarm at the wastewater pretreatment area.

7. There are over 200 dry chemical fire extinguishers located throughout the refinery which can be used for early stage fire fighting. In addition, there are a number of 150# and 350# wheeled units located strategically throughout the refinery.

8. Oil spill equipment including absorbent booms and pads are stored in Box 116.



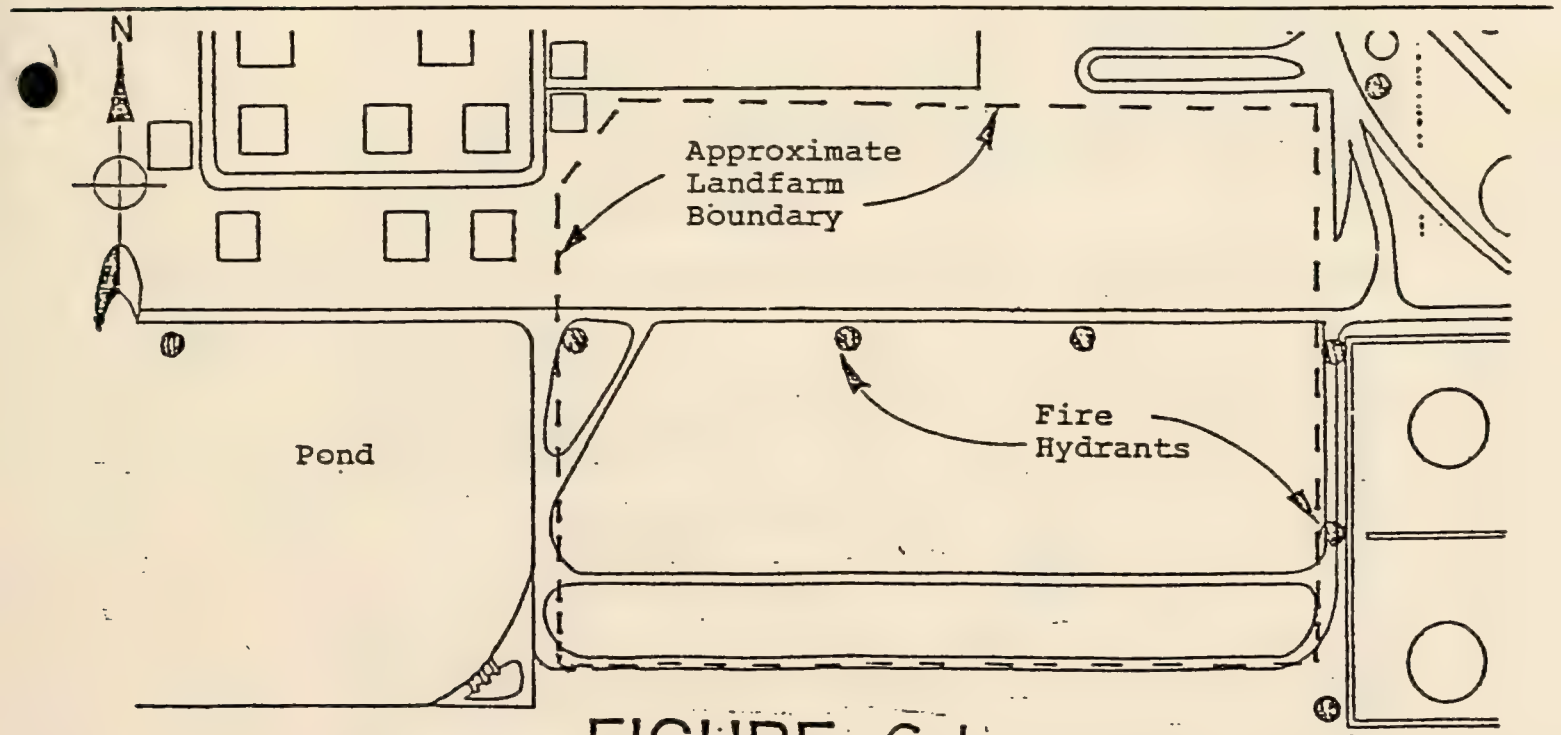


FIGURE 6-1
FIRE HYDRANT LOCATION NEAR HAZARDOUS WASTE FACILITIES
CENEX-LAUREL, MONTANA REFINERY

MODULE III - CLOSURE OF THE LAND TREATMENT UNIT

III.A. GENERAL INFORMATION

III.A.1. Applicability

The requirements of this Permit Module apply to the closure procedures and monitoring of the land treatment unit identified in Condition II.A. at the Cenex refinery during the closure period. The closure period is that time between the issuance of this Permit and certification of closure. The Permittee must close, maintain, and monitor the land treatment unit in accordance with this Permit, applicable requirements in Title 16, Chapter 44, ARM, and as specified in the Application and addenda to the Application and the Closure Plans.

III.A.2. Description of Land Treatment Unit

The land treatment unit consists of 30 acres of which 22.5 acres have been used for land treatment. The unit is divided into two portions. (See Attachment III.1.) The southern portion is referred to in this Permit as the Old Landfarm (OLF) and covers 14.5 acres. The OLF was constructed and begin operation in 1964, and waste was applied until 1981. The northern 8 acres of the land treatment unit are referred to in this Permit as the New Landfarm (NLF). Waste was applied to the NLF from 1981-1988. In November, 1988 all application of waste to the land treatment unit ceased. The term "land treatment unit" is used in this Permit to refer to the combined NLF and OLF.

III.B. WASTE TREATED AND DISPOSED OF AT THE LAND TREATMENT UNIT

III.B.1. Hazardous Wastes

The following listed hazardous wastes were treated and disposed of at the land treatment unit:

API Separator Sludge	K051
DAF Float	K048
Leaded Tank Bottoms	K052

Heat Exchanger Bundle Cleaning Sludge (K050) was collected as API Separator Sludge.

The major wastes disposed of at the land treatment unit were API Separator Sludge and DAF Float. These wastes were collected together at the wastewater treatment area and transported by vacuum truck to the land

treatment unit. Leaded tank bottoms were treated and disposed of in the Lead Weathering Area located in the OLF. Attachment III.1 shows the location of the lead weathering area. Attachments III.4 and III.5 are summaries of waste application.

III.B.2. Nonhazardous Wastes

In addition to the above listed hazardous wastes, the following nonhazardous wastes were applied to the land treatment unit:

River silt
Cooling tower sludge
Crude tank bottoms
Intermediate tank bottoms
Product tank bottoms
Biological treatment pond sludge
Oil contaminated soil and gravel
Process vessel wastes
Monitor well water

Attachments III.4 and III.5 include summaries of nonhazardous waste applied to the land treatment unit.

III.B.3. Waste Management Units

In addition to the hazardous and nonhazardous wastes applied to and treated at the landfarm, a number of Waste Management Units exist within the OLF. These units are shown in Attachment III.6. and the wastes placed in them in Attachment III.6.a. Their management is addressed in Module VI of this Permit.

III.C. CLOSURE STANDARD

The Permittee shall close the land treatment unit in a manner that minimizes the need for further maintenance of the facility; and controls, minimizes or eliminates, to the extent necessary to protect human health and the environment, post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated run-off, or hazardous waste decomposition, products to the groundwater or surface waters or to the atmosphere.

III.D. CLOSURE PLANS

III.D.1. The NLF shall be closed in accordance with the Closure Plan in Attachment III.2. The closure shall proceed in three steps:

1. Remediation of the B05 area
2. Phase I - Continued waste treatment and monitoring

3. Phase II - Stabilization and establishment of vegetative cover

III.D.2. The OLF shall be closed in accordance with the Closure Plan in Attachment III.3. and Attachment III.3.a. The closure shall proceed in two steps:

1. Waste at Depth Reconnaissance Survey and bioremediation of soils (Phase 1).

2. Phase II - Stabilization and establishment of vegetative cover (Phase II).

III.E. AMENDMENT OF THE CLOSURE PLAN

The Permittee shall submit a written request in compliance with ARM 16.44.116 for a permit modification to authorize a change in operating plans, facility design, or the approved closure plan in accordance with the procedures in Title 16, Chapter 44, Subchapters 1 and 9, ARM. The written request shall include a copy of the amended closure plans for approval by the Department.

III.E.1. The Permittee may submit a written request to the Department for a permit modification to amend the closure plans at any time prior to the notification of partial or final closure of the facility.

III.E.2. The Permittee shall submit a written request for a permit modification to authorize a change in the approved closure plans whenever:

III.E.2.a. Changes in operating plans of facility design affect the closure plans;

III.E.2.b. There is a change in the expected year of closure, if applicable;

III.E.2.c. In conducting partial or final closure activities, unexpected events require a modification of the approved closure plan;

III.E.2.d. Requested by the Department under the conditions described in Conditions III.E.2.a-c above.

III.E.3. The Permittee shall submit a written request for a permit modification including a copy of the amended closure plan and revised cost estimates as required under Condition III.Q. for approval at least 60 days prior to the proposed change in facility design or operation or no later than 60 days after an unexpected event has occurred which has affected the closure plan. If an unexpected event occurs during the partial or final closure period, the Permittee shall request a permit modification no later than 30 days after the unexpected event. The Department will approve, disapprove, or modify this amended plan in accordance with the procedures in Title 16,

Chapter 44, Subchapters 1 and 9, ARM. The approved closure plan will become a condition of this Permit.

III.E.4. The Department may request modifications to the plan under the conditions described under III.E.2. of this Module. The Permittee shall submit the modified plan within 30 days. Any modifications requested by the Department will be approved in accordance with the procedures in Title 16, Chapter 44, Subchapters 1 and 9, ARM.

III.F. CERTIFICATION OF CLOSURE

Within 60 days of completion of closure of the land treatment unit identified in Condition II.A., the Permittee shall submit to the Department, by registered mail, a certification that the land treatment unit has been closed in accordance with the specification in the approved closure plan. The certification shall be signed by the Permittee and by an independent registered professional engineer. Documentation supporting the independent registered professional engineer's certification shall be furnished to the Department upon request until the Permittee is released from the financial assurance requirements for closure under Permit Condition III.R.

III.G. SURVEY PLAT

No later than the submission of the certification of closure, the Permittee shall submit to the local zoning authority or the authority with jurisdiction over local land use, to the Department, and to the county planner or equivalent, a survey plat indicating the location and dimension of the land treatment unit with respect to permanently surveyed benchmarks. This plat shall be prepared and certified by a professional land surveyor. The plat filed with the local zoning authority or the authority with jurisdiction over local land use and shall contain a note prominently displayed, which states the Permittee's obligation to restrict disturbance of the hazardous waste disposal unit in accordance with Module IV. The plat and disturbance restriction notice shall also be attached to all instruments of conveyance such as deeds or contracts for deeds.

III.H HORIZONTAL AND VERTICAL DIMENSIONS OF THE TREATMENT ZONE

III.H.1. The treatment zone is the portion of the unsaturated zone below and including the land surface in which the conditions necessary for effective degradation, transformation, or immobilization are maintained. The horizontal dimensions of the treatment zone are the areas within the application dikes in Attachment III.1.

III.H.2. The Zone of Incorporation (ZOI) consists of a soil layer from the ground surface to a point 12 inches below the surface within the treatment zone.

III.H.3. The total depth of the treatment zone shall in no event exceed 5 feet. The

maximum depth of the treatment zone must at all times be a minimum of 3 feet above the seasonal high water table. No later than 30 days after the effective date of this Permit, the Permittee shall submit to the Department a map of the land treatment unit dividing the horizontal surface into units based upon the depth to water.

III.I. OPERATION OF THE LAND TREATMENT UNIT DURING CLOSURE

III.I.1. General Requirements

III.I.1.a. The Permittee shall operate and maintain the land treatment unit during the closure period to maximize the degradation, transformation, and immobilization of hazardous constituents in the treatment zone. The unit must be operated in accordance with the methods described in the Application and the Conditions contained in this Module.

III.I.1.b. The Permittee shall utilize a series of records identified in Condition III.P. of this Module to evaluate the operation of the land treatment unit. Records shall be kept for all of the following: testing and application to control pH, testing and application for nutrient addition, tillage, control of moisture and wind dispersal, inspections, and monitoring.

III.I.2. Disposal or Decontamination of Equipment

The Permittee shall decontaminate and/or dispose of all facility equipment and residues as required by 40 CFR 264.114.

III.I.3. Measures to Control pH

The Permittee shall monitor and control pH as described in the closure plans. The target pH is 6.0 to 9.0.

III.I.4. Nutrient Addition

The Permittee shall monitor and control nutrient level as described in the closure plans. At a minimum, nutrients shall be maintained at the following levels:

50 ppm Nitrogen
20 ppm Phosphorus

Nitrogen shall be applied as ammonium fertilizer to limit losses due to leaching.

III.I.5. Tillage

III.I.5.a. The Permittee shall utilize tillage of the ZOI to enhance microbial

degradation of the applied waste.

III.I.5.b. All portions of the land treatment unit shall be tilled every month, from May through November, except when Condition III.I.5.c. applies.

III.I.5.c. The Permittee shall perform tillage at those times which can minimize wind dispersal. The Permittee shall ensure that tillage does not result in airborne dispersal of soils during dry periods and under excessively windy conditions.

III.I.6. Control Wind Dispersal

The Permittee shall ensure that airborne dispersal of wastes and surface soils will be kept to a minimum. Tillage shall be avoided during excessively dry or windy periods. The Permittee shall note in the operating log any incidents of blowing soils or wastes and document efforts made to control wind dispersal.

III.I.7. Establishment of Vegetative Cover

The Permittee shall establish a vegetative cover of the land treatment unit being closed at such time that the cover will not substantially impeded degradation, transformation, or immobilization of hazardous waste in the treatment zone. The criteria outlined in Condition III.N.1. must be met before a vegetative cover is established. The vegetative cover must be capable of maintaining growth without extensive supplemental irrigation.

III.J. RUN-ON AND RUN-OFF SYSTEMS

III.J.1. The Permittee shall operate and maintain control structures such as dikes and drainage swales, for the land treatment unit that will:

III.J.1.a. Prevent run-on flow onto the treatment zone during peak discharge from a 25-year storm;

III.J.1.b. Collect and control run-off resulting from at least the water volume from a 24-hour, 25-year storm.

III.J.2. The control structures shall be inspected monthly and after storms, and must be maintained during the closure period.

III.J.3. The Permittee shall perform repairs or maintenance as necessary to ensure that proper performance of the control structures is maintained. Repairs are to be made within one week of the time damage is noted.

III.K. INSPECTION OF LAND TREATMENT UNIT

III.K.1. The Permittee shall follow the schedule of inspection for the land treatment unit shown in Attachment II.2.

III.K.2. The inspection checklist shown in Attachment II.2 shall be followed. Fencing, dikes, warning signs, road conditions and monitor wells shall be included in the inspection.

III.K.3. Unusual conditions such as ponded water or wind blown soil, if present, shall be noted in the operating log.

III.K.4. All inspection activities shall be noted and made part of the operating record.

III.L. FOOD CHAIN CROPS

No crops or commercial forage shall be grown on any land at this facility which has been used for the treatment of hazardous wastes.

III.M. LAND TREATMENT MONITORING REQUIREMENTS

III.M.1. General Requirements

III.M.1.a. The Permittee shall follow a regular schedule of monitoring as described in this Condition for soils and in Module V and groundwater.

III.M.1.b. The Permittee shall follow the evaluation requirements established in Condition N of this Module.

III.M.1.c. All monitoring involving collection and analysis of samples shall follow the methods and procedures established in Condition III.M.2. and Module V, including the criteria established for quality assurance and quality control measures.

III.M.1.d. Results of all land treatment monitoring activities shall be noted and maintained in the operating record.

III.M.2. General Sampling Methods

III.M.2.a. All samples are to be collected in accordance with methods outlined in Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods, EPA 1986 (SW-846), or as otherwise specified in this Permit.

III.M.2.b. All samples shall be iced or preserved as specific analytical methods dictate at the time of collection and during transport to the laboratory. A chain of custody form from the field to the laboratory must be maintained and documented.

III.M.2.c. All sampling equipment must be precleaned and decontaminated between samples as required.

III.M.2.d. Records of all sampling methods and events shall be incorporated into the operating record.

III.M.3. Selection of Random Sampling Sites

Where random soil samples are required, the sample sites will be selected as follows:

III.M.3.a. The land treatment unit is divided into six sampling areas as shown in Attachment III.7. The Permittee shall choose soil sampling points in the following manner:

III.M.3.a.i. Two random numbers will be selected from a random numbers table. These numbers will be used to locate two points along a coordinate grid for each sampling area.

III.M.3.a.ii. The intersection point of two lines drawn perpendicular to the two base line points will be located. This intersection point represents one randomly selected location for collection of one soil core or sample. If the point of intersection is outside the land treatment unit, within 10 meters of another sampling location, or within twenty feet of the area boundary, the point shall be discarded and another random point shall be selected.

III.M.3.a.iii. Steps i and ii shall be repeated as many times as necessary to obtain the required number of sampling sites.

III.M.3.b. The procedure for random selection of sampling sites within uniform areas must be performed for each soil core sampling event.

III.M.4. General Analytical Methods

III.M.4.a. Attachment III.8. lists all applicable test methods to be used in the land treatment monitoring program.

III.M.4.b. Analytical reports shall contain the following information:

III.M.4.b.i. Analytical methods used, including method number references;

III.M.4.b.ii. Practical quantitation limits (PQLs) for every parameter tested;

III.M.4.b.iii. Quality control information pertinent to analysis (spikes, duplicates, blanks, etc.), including acceptance limits;

III.M.4.b.iv. Laboratory used;

III.M.4.b.v. Data sheets provided by the laboratory;

III.M.4.b.vi. Method detection limits for every parameter tested;

III.M.4.b.vii. PQLs for volatile organic compounds in soils by SW-846, Method 8020, may be no more than ten times the Method Detection Limit given in Table 1 of the method.

III.M.4.b.viii. For ZOI soils during the first two years of closure, PQLs for semi-volatiles in soil by SW-846, Method 8270, may be no more than those given in the method for medium-level soil and sludges by sonicator in Table 2.

II.M..4.b.ix. For treatment zone soils, below treatment zone soils, and ZOI soils after the first two years of closure or when determining whether the closure performance standard has been met, PQLs for low soil/sediments matrices as listed in Table 2 of the method must be used.

III.M.4.c. The Permittee shall ensure that all laboratory analyses undertaken as part of this Permit contain adequate quality control and quality assurance. The laboratory must be capable of evaluating quality control procedures as specified in SW-846. The laboratory must also have quality control and backup information available for specific analyses, which must be submitted to the Department with sample analytical results.

III.M.4.d. The Permittee shall ensure that the PQLs that are specified for given analytical methods, constituents, and media in SW-846 are routinely achieved in all analyses. If the laboratory is unable to meet any of the PQLs required in Conditions III.M.4.b.vii-ix above, a written justification must be provided with the analytical results. The Department reserves the right to review the justification and to accept, reject, or require further justification.

III.M.4.e. Analytical results shall be incorporated into the operating record.

III.M.4.f. The Permittee shall submit to the Department, the Quality Assurance Plan and the name of a contact person for each analytical laboratory which they use.

III.M.5. Zone of Incorporation (ZOI) Soil Monitoring

III.M.5.a. At the end of each year of Phase I Closure, beginning with the fall following issuance of the final permit and every fall there after until Phase I Closure is completed, eight randomly selected ZOI subsamples shall be taken from each of the six sampling areas shown in Attachment III.7. The samples from each area may be composited. The lead weathering area shall be sampled separately.

III.M.5.b. Analytical Parameters

ZOI samples shall be analyzed for the Modified Skinner List in Attachment

III.9. and for soil TOC, available nitrogen, phosphorus, and potassium, pH, and oil and grease. The Permittee may elect to discontinue the annual ZOI analyses for Modified Skinner List parameters until the fifth year of Phase I Closure. However in selecting this option, the Permittee must continue to operate and maintain the land treatment area in accordance with the requirements of Condition III.D.

III.M.5.c. Sample Collection Methods

III.M.5.c.i. Selection of random sampling sites shall be done in accordance with Condition III.M.3. of this Module.

III.M.5.c.ii. The Permittee may collect the ZOI subsamples with a trowel, spade, or other hand sampling device.

III.M.5.c.iii. The Permittee shall keep accurate records of where the ZOI subsamples are taken.

III.M.6. Treatment Zone (TZ) and Below Treatment Zone Soil (BTZ) Core Monitoring

III.M.6.a. Number of Samples and Sampling Frequency

III.M.6.a.i. Within 45 days of the effective date of this Permit, a one time event of eight randomly collected soil cores shall be taken to represent background quality for metals. These samples shall not be composited but shall be analyzed separately. The Department shall approve the location of the samples prior to sampling.

III.M.6.a.ii. Simultaneously with the collection of eight randomly collected ZOI samples collected in Condition III.M.5., two cores shall be collected from each sampling area. Following submission of the information required in Condition III.H.3. concerning depth of the Treatment Zone, the Department shall select sampling depths for the TZ and BTZ samples. These depths shall be in the mid treatment zone and from the bottom of the treatment zone to 6 inches below for the BTZ.

III.M.6.b. Analytical Parameters

III.M.6.b.i. TZ and BTZ samples shall be analyzed for the Modified Skinner List parameters in Attachment III.8.

III.M.6.b.ii. The analytical methods shown in Attachment III.8. shall be used.

III.M.6.c. Sample Types and Collection Methods

III.M.6.c.i. Selection of random sampling sites shall be done in accordance with Condition III.M.3.

III.M.6.c.ii. The two TZ and BTZ samples collected annually from each sampling area shall not be composited but analyzed individually.

III.M.6.c.iii. The Permittee shall keep accurate records of where TZ and BTZ cores are taken.

III.M.6.c.iv. The Permittee shall take precautions, when collecting TZ and BTZ soil samples, to minimize the potential for contamination of samples by overlying surface soils.

III.M.7. Groundwater Monitoring

Groundwater monitoring shall be conducted in accordance with the procedures outlined in Module V.

III.N. MONITORING EVALUATIONS

III.N.1. Zone of Incorporation Soil Monitoring Evaluation

III.N.1.a. Results of pH and nutrient analyses shall be evaluated annually to document that the liming and fertilizer requirements of each sampling area are being met.

III.N.1.b. Results of the metal analyses shall be evaluated to verify that the metals concentrations shown in Attachment III.9. are not exceeded.

III.N.1.c. The Modified Skinner List Constituents in the ZOI shall be evaluated with respect to the closure performance standard as follows:

III.N.1.c.i. If the concentration of all Modified Skinner list organic constituents are below the PQL as given in Attachment III.8., then Phase I is terminated.

III.N.1.c.ii. If any of the Modified Skinner List organic constituents are detected in any of the 6 composites, then normal operating procedures as defined in Condition III.I. shall apply. Cenex may elect to do additional sampling to demonstrate that one or more of the six areas, but not necessarily all, meet the criteria given in Condition III.N.1.c.i. above. A minimum of 3 sampling locations would be required.

III.N.1.c.iii. If second year sampling shows nondetectable modified Skinner List organics in the ZOI, or if there is no change in parameter concentrations greater than plus or minus 20% (including oil and grease) between the first and second years, Phase II of closure may proceed. At the end of the second year, CENEX can elect to demonstrate that an area or areas meet the plus or minus 20% criteria for proceeding into Phase II utilizing a minimum of three locations in the area.

III.N.1.c.iv. The annual sampling will continue until either Phase I criteria are met or a total of 5 years have passed. Cenex may elect to discontinue annual sampling of the ZOI for Skinner list parameters and continue Phase I through the fifth year.

III.N.2. Treatment Zone and Below Treatment Zone Soil Monitoring Evaluation

III.N.2.a. Evaluation of Organic Constituents

Although treatment zone and below treatment zone soils are to be analyzed routinely, in order to monitor for migration of constituents within and out of the treatment zone, only BTZ soils need to be evaluated as described in this Condition. For the organic constituents listed in Attachment III.8., the following evaluation method is outlined:

III.N.2.a.i. If one or more organic constituent is found in any BTZ soil core, the Department must be notified within fifteen days of receipt of the analytical information by the Permittee. Another core must be taken within ten feet from the location where the first core was sampled within thirty days of the Permittee receiving the analytical information.

III.N.2.a.ii. Re-sampling is necessary only for the core or cores that show concentrations above detection and only for those constituents detected.

III.N.2.a.iii. During this period, the Permittee may investigate the possibility that a source other than the land treatment unit is causing the appearance of the hazardous constituents or that the results represent an error in sampling, analysis, or evaluation.

III.N.2.a.iv. If repeat sampling indicates appearance of at least one constituent, it is considered a statistically significant increase. The Department shall be notified within seven days of receipt of the analytical results by the Permittee.

III.N.2.a.v. If it is determined that there has been a statistically significant increase as indicated in Condition III.N.2.a.iv., the Permittee shall submit a plan for modifying the closure plan thirty days. The modification shall describe changes in the closure plan at the land treatment unit that will maximize the success of degradation, transformation or immobilization in the treatment zone or a remediation plan for removal of migrated waste.

III.N.2.b. Evaluation of Inorganic Constituents

Metal concentrations in the land treatment unit BTZ soil samples shall be evaluated by comparison to BTZ concentrations found in the eight background BTZ samples described in Condition III.M.6.a.i. The Permittee shall use a statistical procedure as described under 40 CFR 264.280(d)(3). The recommended statistical method is the Student T difference of means, using the pooled variance approach. The selected statistical approach shall be run at a .01 level of confidence for individual one-tailed tests. Statistically significant concentrations will require the notification and response procedures outlined in Condition III.N.2.a.i. and iv. above.

III.N.3. Groundwater Monitoring Evaluation

Groundwater monitoring evaluation for the land treatment unit will be conducted according to the Permit conditions in Module V, Groundwater Monitoring.

III.O. REPORTING REQUIREMENTS

III.O.1. Annually, by April 1, the Permittee shall submit to the Department a brief report that documents compliance with the metals loading criteria, outlined in Condition III.N.1.b. during the previous calendar year.

III.O.2. Annually, by April 1, the Permittee shall submit to the Department laboratory reports of ZOI, treatment zone, and below treatment zone soil core monitoring for the previous calendar year. If organic hazardous constituents are detected in BTZ soil cores, then additional notification and evaluation procedures will be required as outlined in Condition III.N.2.a.

III.O.3. Reporting requirements for groundwater monitoring are described in Module V, Groundwater Monitoring.

III.P. RECORDKEEPING

III.P.1. The Permittee shall keep written records of the following land treatment unit activities:

III.P.1.a. Tillage dates, areas;

III.P.1.b. Nutrient and pH control application dates and amounts;

III.P.1.c. Any activities taken to control wind dispersal or ponding on the land treatment unit;

III.P.1.d. Records of all inspections; and

III.P.1.e. Monitoring records including sampling logs or notes, analytical results, evaluations, and required reports for ZOI and TZ/BTZ soils, and groundwater samples.

III.P.2. The Permittee shall also keep a record of the following:

III.P.2.a. Valid permit;

III.P.2.b. Closure plan and closure cost estimates (as updated or revised); and

III.P.2.c. Copies of requests for permit modifications or changes in practices or procedures.

III.P.3. All records required under this Condition must be furnished upon request and made available at all reasonable times for inspection by any duly designated representative of the Department.

III.Q. COST ESTIMATE FOR CLOSURE

III.Q.1. The Permittee must adjust the closure cost estimate for inflation within 30 days after the closure of the fiscal year for Cenex. This annual inflation adjustment shall:

III.Q.1.a. Be subject to the permit modification requirements of ARM 16.44.118;

III.Q.1.b. Be calculated using the procedure outlined in ARM 16.44.804.

III.Q.2. The Permittee must revise the closure cost estimate no later than 30 days after the Department has approved a request to modify the closure plan. This condition is subject to the permit modification requirements of Permit Condition III.E. and ARM 16.44.116. The revised closure cost estimate must be adjusted for inflation as specified in Permit Condition III.Q.1.

III.R FINANCIAL ASSURANCE FOR CLOSURE

The Permittee shall demonstrate continuous compliance with ARM 16.44.815 by providing documentation of financial assurance, as required by ARM 16.44.823 in at least the amount of the cost estimates required by Permit Condition III.Q.1. Changes in the financial assurance mechanism must be approved by the Department.

MODULE III - ATTACHMENTS

Attachment III.1.: Old and New Landfarms

Attachment III.2.: New Landfarm Closure Plan

Attachment III.3.: Old Landfarm Closure Plan

Attachment III.3.a.: Addendum to Closure Plan

Attachment III.4.: Summary of Waste Landfarmed

Attachment III.5.: Annual Waste Landfarm Loading

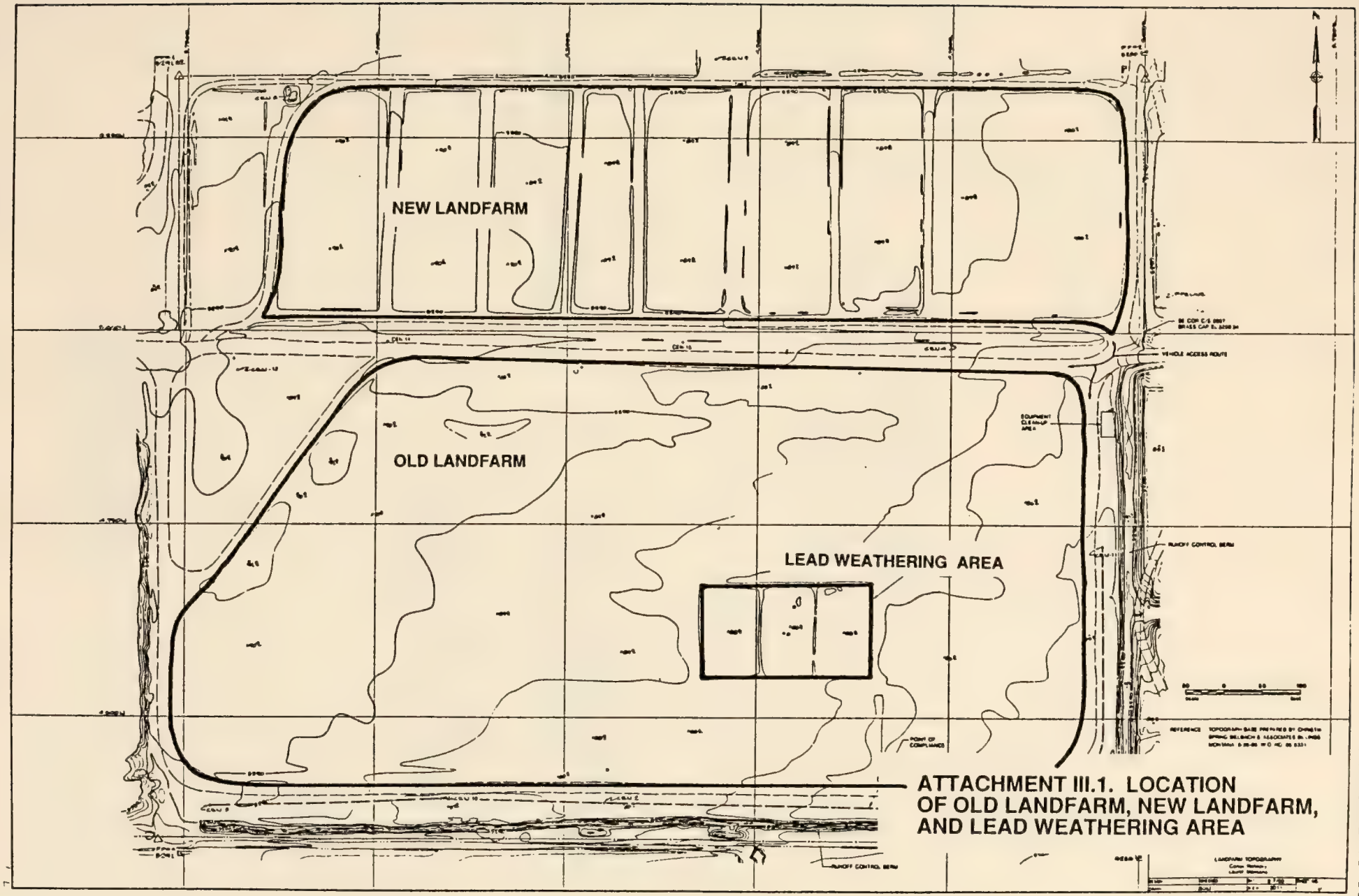
Attachment III.6.: Location of Solid Waste Management Units

Attachment III.6.a.: Hazardous and Nonhazardous Waste Disposal at the OLF

Attachment III.7.: Land Treatment Unit Sampling Areas

Attachment III.8.: Parameters, Analytical Methods, and Reporting Limits

Attachment III.9.: Maximum Allowable Metal Concentrations



ATTACHMENT III.1. LOCATION OF OLD LANDFARM, NEW LANDFARM, AND LEAD WEATHERING AREA

V. CLOSURE AND POST-CLOSURE PLAN
LAND TREATMENT FACILITY

Farmers Union Central Exchange, Inc.
(CENEX)
Laurel, Montana Refinery

November 2, 1985

W.O. #30-05

Kenneth R. Schroeder

Brian P. Flynn, P.E.
Principal

Prepared By:
ERM-Southwest, Inc,
8989 Westheimer, Suite 111
Houston, Texas 77063
(713) 789-6652

CLOSURE AND POST-CLOSURE PLAN
LAND TREATMENT FACILITY

Farmers Union Central Exchange, Inc.
(CENEX)
Laurel, Montana Refinery

ERM-Southwest, inc.

FINAL MODIFICATIONS TO CENEX CLOSURE PLAN, as made by the Montana Department of Health and Environmental Sciences, October 2, 1989

2-General Plan Requirements

2.7 Estimated Closure Date

Closure may be certified after placement of the vegetative cover but prior to its establishment, if the establishment should require more than one growing season. If so, conditions will be placed upon the closure certification to require that the vegetative cover be inspected and re-seeded as necessary until the vegetation is able to reproduce.

3-Closure Plan

3.1 Phase I Closure

1. Nutrient addition:

At a minimum, nutrients shall be maintained at the following levels:

50 ppm nitrogen
20 ppm phosphorus

Nitrogen shall be applied as ammonium fertilizer to limit losses due to nitrate leaching.

6. Ground water monitoring:

CENEX will submit a Ground Water Assessment Plan by October 31, 1989. The Department will then review the Plan and approve, disapprove, or modify the Plan.

3.2 Phase I Closure Criteria

To sample the ZOI, eight randomly selected subsamples shall be taken from each of six sampling areas. The attached map shows the six sampling areas. The dashed line on the map represents the revised boundary between Areas C and E and Areas D and F. A composite sample for each area will be made from the eight samples. In order to meet Phase I Closure criteria, non-detection shall be defined as values less than those listed as reporting levels in Attachment 3. Metals closure criteria will be based on Table 3-4 in the Closure Plan which gives the maximum allowable metal accumulations in the ZOI. Attachment 3 also lists required parameters and methods for soil core monitoring.

Should CENEX choose the option of meeting Phase I Closure criteria by tilling for five years without sampling, the Department may, upon evaluation of the ground water assessment program, require sampling of the ZOI soils only for the parameters listed in Attachment 1.

The sucess of the vegetative cover will be judged by:

-its ability to prevent wind dispersal of landfarm soils

-its ability to reproduce

3.4 Area B05 Investigation

Area B05 borings shall be sampled from 60 to 70 inches and analyzed for oil and grease. The results will be used to confirm the accuracy of the visual examination of the soil. CENEX will notify the Department when the borings are to be taken. Results from the boring and the analyses, along with a plan to remediate the area, will be due 90 days after the borings are taken.

Table 5-1. Estimated Landfarm Closure Costs

This table has been modified by CENEX to reflect costs of groundwater assessment monitoring and B05 soil analyses.

Attachment 1. Parameters, Methods, and Reporting Limits for ZOI Soil Monitoring

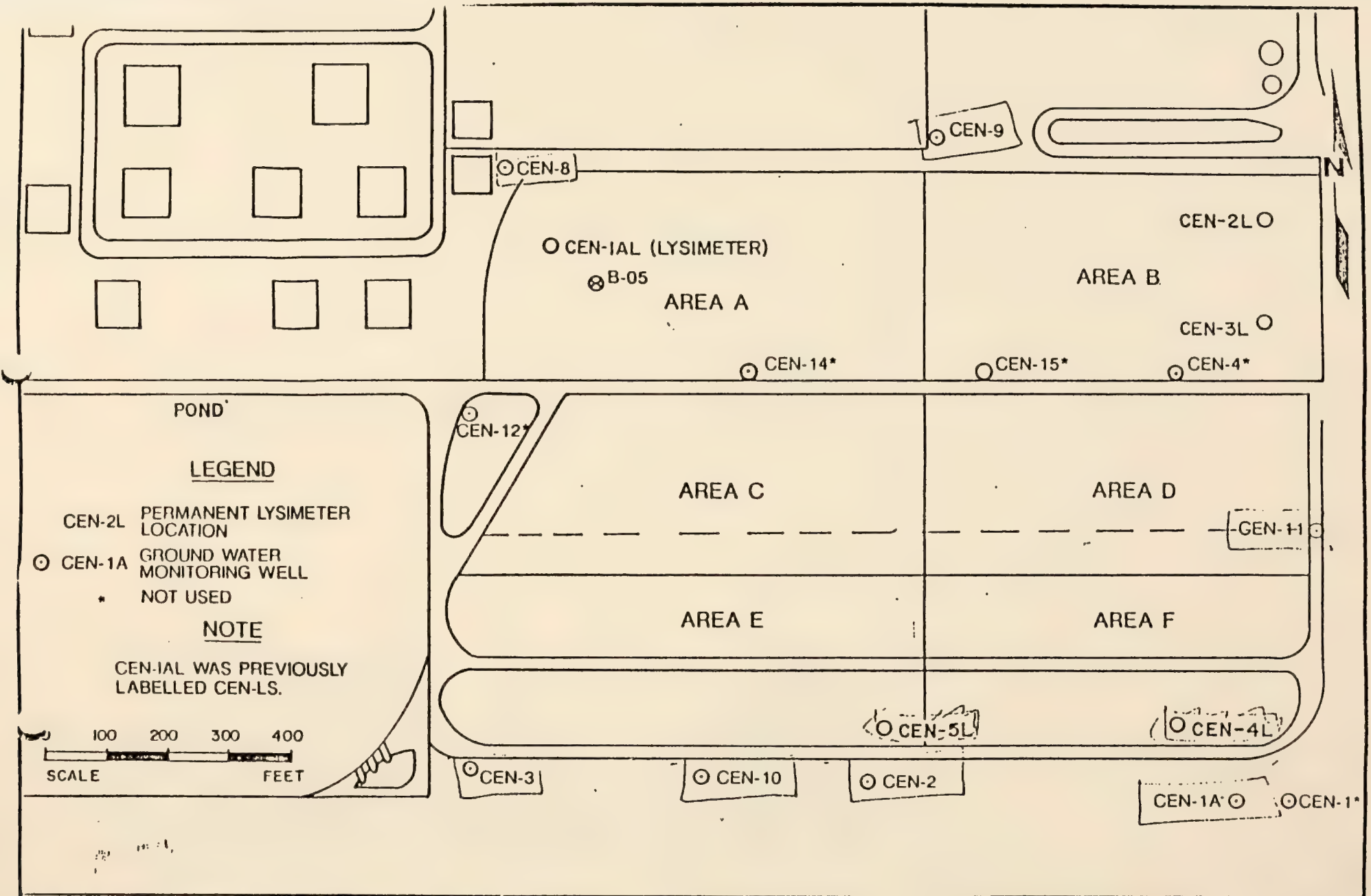
1. Metals	Method (SW-846)	Reporting Limits(ug/g)
Antimony	7040	10.0
Arsenic	7061	1.0
Barium	7080	5.0
Beryllium	7090	.25
Cadium	7130	.25
Chromium	7190	2.50
Cobalt	7200	2.50
Copper	7210	1.00
Lead	7420	5.00
Mercury	7471	.25
Nickel	7520	5.00
Selenium	7740	1.0
Silver	7760	.50
Thallium	7840	5.00
Vanadium	7910	10.00
Zinc	7950	.25

2. Volatiles	Method (SW-846)	Reporting Limit(µg/g)*
Benzene	8240	1.0
Carbon disulfide	8240	12.5
Chlorobenzene	8240	1.0
Chloroform	8240	1.0
1,2-Dichloroethane	8240	1.0
1,4-Dioxane	8240	1.0
Ethylbenzene	8240	1.0
Methyl ethyl ketone	8240	1.0
Styrene	8240	1.0
Toluene	8240	1.0
m-Xylene	8240	1.0
o-Xylene	8240	1.0
p-Xylene	8240	1.0

*Practical Quantitation Limits for high level soils (wet weight basis)

3. Semi-Volatile Base/Neutral Extractablle Compounds

Compound	Reporting Limit (µg/g)* SW-846/8270
Anthracene	5.0
Benzo(a)anthracene	5.0
Benzo(b)fluoranthene	5.0
Benzo(k)fluoranthene	5.0
Benzo(j)fluoranthene	5.0
Benzo(a)pyrene	5.0



ERM-Southwest, inc.
NEW ORLEANS, LOUISIANA HOUSTON, TEXAS

REVISED 7/89 | W.O.NO. 3009A001

FIGURE 3-1
SAMPLES LOCATIONS AND AREAS
CENEX Land Treatment Facility
Laurel, Montana

Attachment 3 continued.

Bis(2-ethylhexyl)phthalate	5.0
Butyl benzyl phthalate	5.0
Chrysene	5.0
Dibenz(a,h)acridine	5.0
Dibenz (a,h)anthracene	5.0
o-dichlorobenzenes	5.0
m-Dichlorobenzene	5.0
p-Dichlorobenzene	5.0
Dimethylphthalate	5.0
7,12-Dimethylbenz(a)anthracene	5.0
Dimethylphthalate	5.0
Di(n)butyl phthalate	5.0
Fluoranthene	5.0
Indene	5.0
Methyl chrysene	5.0
1-Methyl naphthalene	5.0
Naphthalene	5.0
Phenanthrene	5.0
Pyrene	5.0
Pyridine	5.0
Quinoline	5.0

Acid Extractables

Benzenethiol	5.0
2-methylphenol	5.0
3-methylphenol	5.0
4-methylphenol	5.0
2,4-Dimethylphenol	5.0
2,4-Dinitrophenol	25..0
4-Dinitrophenol	25.0
Phenol	5.0

*Practical Quantitation Limits for medium-livel soils (wet weight)

Attachment 3. Parameters, Methods, and Reporting Limits for Soil Monitoring

1. Metals	Method (SW-846)	Reporting Limits(µg/g)
Antimony	7040	10.0
Arsenic	7061	.10
Barium	7080	5.0
Beryllium	7090	.25
Cadium	7130	.25
Chromium	7190	2.50
Cobalt	7200	2.50
Copper	7210	1.00
Lead	7420	5.00
Mercury	7471	.010
Nickel	7520	5.00
Selenium	7740	.10
Silver	7760	.50
Thallium	7840	5.00
Vanadium	7910	10.00
Zinc	7950	.25

2. Volatiles	Method (SW-846)	Reporting Limit(µg/g)*
Benzene	8240	1.0
Carbon disulfide	8240	12.5
Chlorobenzene	8240	1.0
Chloroform	8240	1.0
1,2-Dichloroethane	8240	1.0
1,4-Dioxane	8240	1.0
Ethylbenzene	8240	1.0
Methyl ethyl ketone	8240	1.0
Styrene	8240	1.0
Toluene	8240	1.0
m-Xylene	8240	1.0
o-Xylene	8240	1.0
p-Xylene	8240	1.0

*Practical Quantitation Limits for high level soils (wet weight basis)

3. Semi-Volatile Base/Neutral Extractablle Compounds

Compound	Reporting Limit (µg/g)* SW-846/8270
Anthracene	5.0
Benzo(a)anthracene	5.0
Benzo(b)fluoranthene	5.0
Benzo(k)fluoranthene	5.0
Benzo(j)fluoranthene	5.0
Benzo(a)pyrene	5.0

CLOSURE AND POST-CLOSURE PLAN
NEW LANDFARM (NLF) TREATMENT AREA

Farmers Union Central Exchange, Inc.
(CENEX)
Laurel, Montana Refinery

[Revised July 21, 1989]
[Originally Submitted November 9, 1988]

W.O. #30-09

J. Martin Briggs

J. Martin Briggs, P.E.

Brian P. Flynn

Brian P. Flynn, P.E.
Principal

Prepared By:

ERM-SOUTHWEST, INC.
16000 Memorial Drive, Suite 200
Houston, Texas 77079
(713) 496-9600

Revised 9/90
U523

TABLE OF CONTENTS

Section		Page
1	INTRODUCTION	1-1
	1.1 Background	1-1
	1.2 Scope and Objectives	1-1
2	GENERAL PLAN REQUIREMENTS	2-1
	2.1 Plan Availability	2-1
	2.2 Revisions to Plan	2-1
	2.3 Equipment Decontamination	2-1
	2.4 Maximum Waste Inventory	2-1
	2.5 Closure and Post-Closure Certification	2-1
	2.6 Deed Recordation	2-2
	2.7 Estimated Closure Date	2-2
3	CLOSURE PLAN	3-1
	3.1 Phase I Closure	3-1
	3.2 Phase I Closure Criteria	3-8
	3.3 Phase II Closure	3-8
	3.4 Area B05 Investigation	3-9
4	POST-CLOSURE PLAN	4-1
	4.1 General	4-1
	4.2 Inspection Schedule	
	4.3 Ground Water and Soil Core Monitoring	4-1
	4.4 Maintenance	4-4
5	COST ESTIMATES	5-1
6	PERSONNEL TRAINING	6-1
	6.1 Introduction	6-1
	6.2 Training Course Outline	6-1
	6.3 Training Frequency	6-2
	6.4 Training Records	6-2
	6.5 Summary	6-2

APPENDICES

APPENDIX A - Plan Revision Log

APPENDIX B - Deed Recordation

CLOSURE AND POST-CLOSURE PLAN
LAND TREATMENT FACILITY

Farmers Union Central Exchange, Inc.
(CENEX)
Laurel, Montana Refinery

1 - INTRODUCTION

1.1 Background

The CENEX Refinery located in Laurel, Montana uses land treatment for treatment and disposal of hazardous wastes generated as a result of refining operations.

The regulated hazardous waste facility includes a 30-acre land treatment area (landfarm) for the treatment and disposal of a mixture of API/DAF sludges plus leaded tank bottoms. This facility currently has "interim status" under the hazardous waste regulations. However, during a Land Treatment Demonstration Reconnaissance Survey, the presence of hazardous waste constituents at a depth slightly greater than five feet was discovered. This made it infeasible for an operating Part B permit to be issued for this hazardous waste treatment unit. Thus, waste disposition to this unit ceased on November 7, 1988 in recognition that an operating Part B would not be issued. CENEX now wishes to formally close this inactive facility unit in two phases, and then place the unit in post-closure care.

This plan outlines the method of closure and post-closure care for the 30-acre landfarm. It is written to meet the requirements of the Resource Conservation and Recovery Act (RCRA) of 1976 as implemented by the State of Montana under EPA authorization.

1.2 Scope and Objectives

The RCRA regulations require that hazardous waste treatment, storage and disposal facilities have written closure plans available for inspection. These plans specify, for each facility, when it is expected to be closed, the sequence and scheduling of steps to completely close the facility, the maximum hazardous waste material inventory and extent of the unclosed portion of the facility during its lifetime, decontamination procedures, etc. The intent of the plan is to define closure steps to ensure closure is done in such a manner as to avoid release of hazardous materials to the environment.

A post-closure plan is required for each "facility or part of a facility at which hazardous waste is intentionally placed into or on any land or water and at which waste will remain after closure". The post-closure period normally lasts for thirty years.

Specific elements of each plan include ground water monitoring, maintenance of monitoring and waste containment equipment, and deed restrictions on subsequent land use.

2 - GENERAL PLAN REQUIREMENTS

2.1 Plan Availability

This plan is available at the office of:

Support Systems Engineer
CENEX
Box 909
Laurel, Montana 59044

2.2 Revisions to Plan

During the implementation of this closure and post-closure plan, it may become necessary to modify it due to unforeseen circumstances, changes in regulations, etc. If this becomes necessary, the Montana DHES will be contacted and changes to this plan will be documented in writing. Any changes made will be listed in Appendix A to this plan.

2.3 Equipment Decontamination

All trucks and tilling equipment associated with the landfarm facility will be decontaminated by hydroblasting within the landfarm area.

2.4 Maximum Waste Inventory

We have estimated that the hazardous waste inventory applied to the landfarm is approximately 5,520 dry tons.

2.5 Closure and Post-Closure Certification

Closure will be certified by a CENEX representative and an independent qualified soil scientist or registered Professional Engineer within sixty days of the completion of Phase II of the closure. Certification will consist of a review of operating records collected during the life of the facility, inspection of the vegetative cover and inspection of decontaminated equipment.

Within sixty days of the completion of the post-closure care period, a certification signed by CENEX and an independent registered professional engineer or qualified soil scientist will be sent to Montana DHES. This certification will show that post-closure care was performed in accordance with this plan. If there were any exceptions to the plan, they will be noted.

2.6 Deed Recordation

A notation has been placed in the deed records for the facility that will notify in perpetuity any potential purchasers of the property that the land has been used to manage hazardous wastes and that its use is restricted. A copy of the deed recordation is included in Appendix B.

Within 90 days after Phase II of the closure is completed, CENEX will submit to the County Clerk and to the State of Montana's Department of Health and Environmental Sciences, a survey plat indicating the location and dimensions of the landfarm with respect to permanent surveyed bench marks prepared and certified by a professional land surveyor. This plat will contain a note which states CENEX's obligation to restrict disturbance of the site. A record of the type, location, and quantity of hazardous wastes disposed of within the landfarm area will be submitted with the survey plat.

2.7 Estimated Closure Date

Closure will begin upon approval of this plan by Montana DHES. The schedule for closure and post-closure will be dictated by the degradation rate of organic compounds in the facility. Degradation of organics could require as little as six months to as much as two years to complete. At completion of degradation of organics, approximately 180 days to one year will be required for establishment of the vegetative cover, depending on the season in which Phase II of the closure is completed.

The landfarm is located on a 30 acre tract of land within the refinery property boundary. Excluding the land utilized for access roads and monitoring wells, approximately 75% of this 30 acres (or 22.5 acres) has been utilized for land treatment of hazardous wastes generated at the refinery.

The placement of hazardous waste at the landfarm has already been discontinued. Closure of the landfarm will be completed in two phases. Phase I and Phase II of the closure plan will be implemented as described below.

Phase I: Continued waste treatment (without additional waste application)
Phase II: Stabilize land treatment area and establish vegetative cover

3.1 Phase I Closure

Phase I of the closure period will begin immediately after approval of this plan and will consist of routine operation of this landfarm until the Phase I Closure criteria are met (see Section 3.2).

Data available from other refinery landfarms indicates that 70 to 90 percent of the applied waste degrades each year (if frost does not occur). For the CENEX Refinery, where freezing conditions could conceivably occur 6 months per year, the Phase I closure period may continue approximately two years after final waste placement, i.e. enough time to allow at least two summers of biological activity. Over 180 days is requested for closure as a result of the time required to biologically stabilize the waste. Table 3-1 presents Phase I closure maintenance and inspection activities.

During Phase I of the closure period, the landfarm will be operated in the following manner:

1. All operations (including pH control) necessary to maximize degradation, transformation, or immobilization of hazardous constituents within the treatment zone will continue until closure is completed. This will include tillage, nutrient addition (if required) and moisture control as required.

   Six composite soil samples, collected from the top 8" of soil, will be analyzed annually (as well as within 30 days of the start of Phase I closure) to monitor soil pH, soil TOC, nutrients and the modified Skinner

TABLE 3-1

Landfarm Closure Maintenance Activities

Activity	Purpose	Frequency
Phase I:		
Disk Active Area	Maintain aerobic soil conditions	1/mo (seasonally)
Check soil pH/add lime (if needed)	Maintain pH $\geq$ 6.0 and $\leq$ 9.0	1/yr and within 30 days of start of closure
Check soil carbon content versus NPK/fertilize (if needed)	Nutrient addition Maintain C/N/P/K ratio of 100/2/2/2	1/yr and within 30 days of start of closure
Inspect run-on/run-off berms	Detect deterioration	1/mo
Collect/analyze soil	Determine when treatment is complete	2/yr
Ground Water Monitoring	Determine quality of uppermost aquifer below treatment area	2/yr
Unsaturated Zone Monitoring	Determine quality of soil pore water	once only (90 days after final waste placement)
Soil Core Analysis	Monitor for waste constituents in soil column	1 2/yr (Changed from 2→1 in final modification, 9-29-89)
Phase II:		
Seed Grass	Establish vegetative cover	once only

List shown in Table 3-2. The soil sample will be analyzed at a soils/agricultural laboratory to determine if the appropriate nutrients are contained in the soil. The nutrient requirement will be based upon a sufficient supply of nitrogen, phosphorus and potassium to support growth of a grass cover. The nutrient requirements for the grass will be adequate to support biological activity in the soil column. Fertilizers and/or soil amendments will be added to the landfarm based upon recommendation of the soil agricultural laboratory.

2. All operations to minimize run-off of hazardous constituents will continue.

3. The run-on control system (dikes) will be maintained.

4. The run-off management system (dikes) will be maintained.

5. Wind dispersal will be monitored during the monthly inspections. Wind dispersal is not anticipated based on past refinery experience. Tillage will be avoided during excessively dry or windy periods. Should wind dispersal be observed during tillage, tilling will be stopped immediately.

6. Ground water and unsaturated zone monitoring will continue as shown in Table 3-3 and will use the procedures as described in CENEX's interim status Ground Water Monitoring and Unsaturated Zone Monitoring Plan, except that soil-pore liquid monitoring will have been terminated as of the approval of this closure plan, since this will have been more than 90 days after the last application of waste. Figure 3-1 shows sampling locations and areas. In addition, it should be noted that ground water monitoring requirements could be altered by a ground water assessment or the issuance of a post-closure care Part B permit.

7. Soil cores will be collected from six locations within the landfarm and analyzed for oil and grease on an annual basis during Phase I closure, as depicted in Table 3-3.

8. The metals criteria shown in Table 3-4 will not be exceeded in the zone of Incorporation. If they are exceeded, a discussion will be held with Montana DHES.

TABLE 3-2

Modified Skinner List

1. Metals

Antimony
Arsenic
Barium
Beryllium
Cadmium
Chromium
Cobalt
Copper
Lead
Mercury
Nickel
Selenium
Silver
Thallium
Vanadium
Zinc

2. Volatiles

Benzene
Carbon disulfide
Chlorobenzene
Chloroform
1,2-Dichloroethane
1,4-Dioxane
Ethyl benzene
Methyl ethyl ketone
Styrene
Toluene
Xylenes (m,o,p)

3. Semi-volatile Base/Neutral Extractable Compounds

Anthracene
Benzo(a)anthracene
Benzo(b)fluoranthene
Benzo(k)fluoranthene
Benzo(j)fluoranthene
Benzo(a)pyrene
Bis(2-ethylhexyl)phthalate
Butyl benzyl phthalate
Chrysene
Dibenz(a,h)acridine
Dibenz(a,h)anthracene
Dichlorobenzenes (o,m-, and p-dichlorobenzene)
Dimethyl phthalate
7,12-Dimethylbenz(a)anthracene
Dimethyl phthalate
Di(n)butyl phthalate
Di(n)octyl phthalate
Fluoranthene
Indene
Methyl chrysene
1-Methyl naphthalene
Naphthalene
Phenanthrene
Pyrene
Pyridine
Quinoline

Semi-Volatile Acid-Extractable Compounds

Benzenethiol
Cresols (o-, m-, and p-cresol)
2,4-Dimethylphenol
2,4-Dinitrophenol
4-Nitrophenol
Phenol

NOTE: Detection limits for organic constituents will be as low as the practical quantification limits for soil sediment samples specified for the appropriate method in SW-846, unless the sample is too contaminated to allow this.

TABLE 3-3

Phase I and II Closure
Ground Water and Unsaturated Zone Monitoring Requirements

Note: All locations cited are existing, normally used locations

Ground Water[a]

Upgradient Wells	(CEN-8&9)	pH, SC, TOC, TOX - 4 replicates, each well, semi-annually.
Downgradient Wells	(CEN-1A, 2, 10 and 3 or 11, depending on ground water flow direction)	Fe, Mn, Na, Cl, SO_4, and phenol - one analysis each well, once per year.
		Water Levels - All wells, each sample event.

Soil Core Samples

Timing	Sample	Analyses
Within 30 days of start of closure, and end of each year during Phase I	Six Landfarm ZOI Composites - 6 samples[b]	Soil TOC; Available N, P & K; pH, Oil and Grease
At end of each year of Phase I	Six Landfarm ZOI Composites - 6 samples[b]	Modified Skinner List (Table 3-3)
At end of each year of Phase I	1 randomly selected core location per area- 6 Total[c]. 3 depths: 6"-12", 30"-36", 60"-66" for total of 18 samples[d].	Oil & Grease - Freon extraction and Gravimetric Analysis

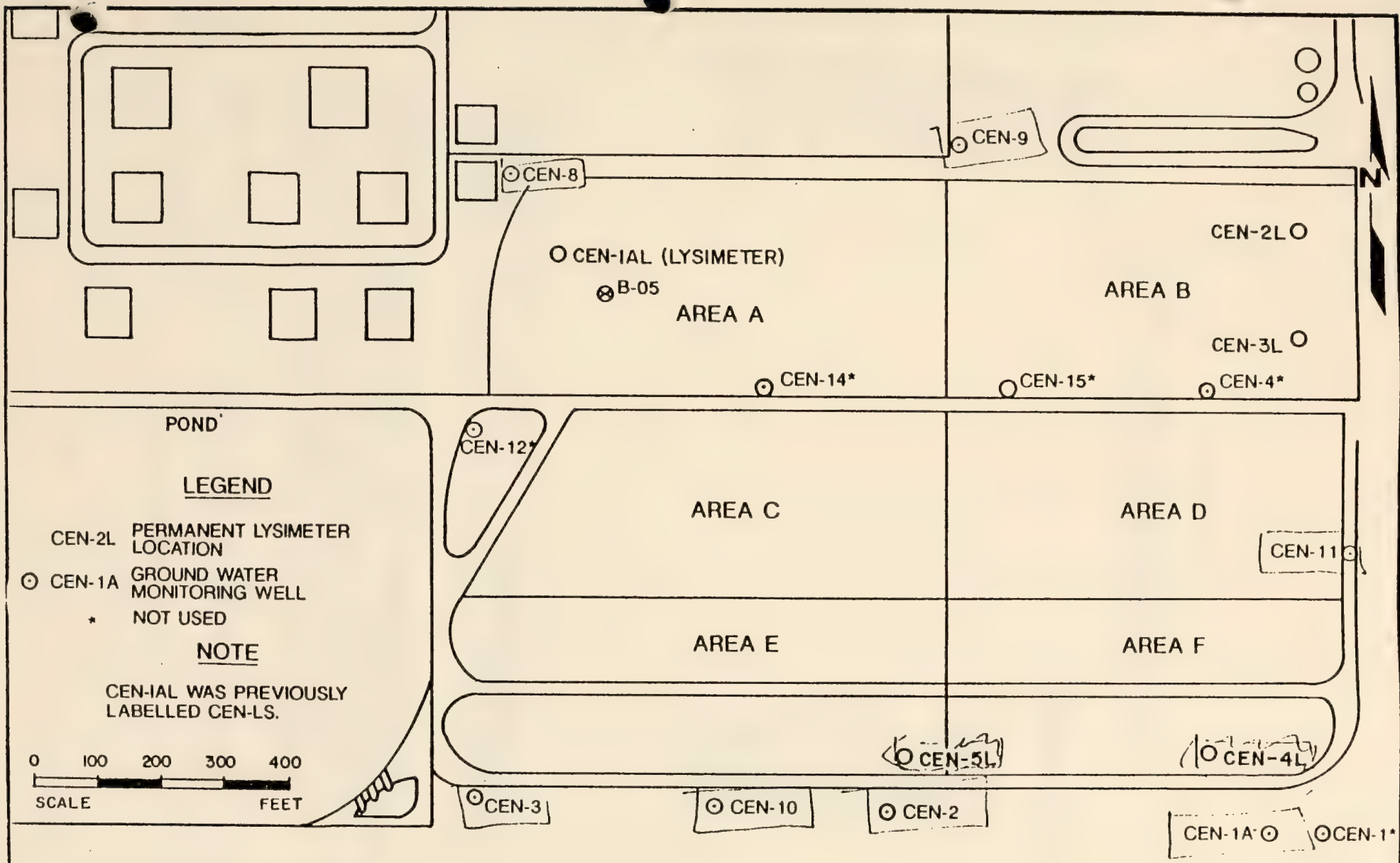
ZOI Zone of Incorporation, first 0-8" of soil

[a] Would be modified if May 1989 sampling indicates that a ground water assessment is needed.

[b] Eight random grab samples per area; six areas.

[c] Locations can be sampled using a hand auger, drilling rig, backhoe, or other equivalent.

[d] Use same core locations, each year.



ERM-Southwest, inc.
NEW ORLEANS, LOUISIANA HOUSTON, TEXAS

DATE	REVISED 7/89	W.O.NO.	3009A001

R117

FIGURE 3-1
SAMPLES LOCATIONS AND AREAS
CENEX Land Treatment Facility
Laurel, Montana

TABLE 3-4

Maximum Allowable Metal Concentrations -
Zone of Incorporation

Parameter Levels	Maximum Allowable
Antimony	250 ppm[1]
Arsenic	300 ppm[2]
Barium	500 ppm[1]
Beryllium	50 ppm[2]
Cadmium	10 ppm[3]
Chromium	1000 ppm[2]
Cobalt	200 ppm[2]
Copper	250 ppm[2]
Lead	1000 ppm[2]
Mercury	10 ppm[1]
Nickel	100 ppm[2]
Selenium	20 ppm[4]
Vanadium	500 ppm[2]
Zinc	500 ppm[2]

[1] Values established from SW-874, Hazardous Waste Land Treatment, EPA, 1983, Table 6.52. The levels have been converted from Kg/ha-30 cm units to ppm, assuming a soil density of 1.35 g/cm^3.

[2] Values established from SW-874, Hazardous Waste Land Treatment, EPA, 1983, Table 6.47. The values are compiled from a literature review in SW-874, and are "based on microbial and plant toxicity limits, animal health considerations, and soil chemistry which reflects the ability of the soil to immobilize the metal elements" (p.272).

[3] Value established at upper limit of native soils range, SW-874.

[4] Value established at 2 x current detection limit.

3.2 Phase I Closure Criteria

Figure 3-2 presents a flow chart of the Phase I closure criteria. If the concentration of Modified Skinner list organic constituents are non-detectable in the six composite Zone of Incorporation (ZOI) samples, and if the oil and grease sampling in the six sets of 6"-12", 30"-36", and 60"-66" intervals does not indicate continued migration of oil and grease (i.e., declining concentrations with depth), then Phase I is terminated and Phase II of the closure can begin. The sampling required for these criteria can occur at the end of the first year of Phase I, however, should CENEX so choose, it can occur earlier.

If any of the Modified Skinner list organic constituents are detected at the end of the first year of Phase I, in any of the six composite zone of incorporation samples, then normal operating procedures as defined in Section 3.1 will continue. However, at CENEX's option, additional sampling could be performed to demonstrate that one or more, but not necessarily all of the six areas actually meet the criteria given in the paragraph above for cessation of Phase I. Such sampling would require three locations in each area to be sampled for ZOI and oil and grease interval samples. This could result in some areas passing into Phase II while others remained in Phase I.

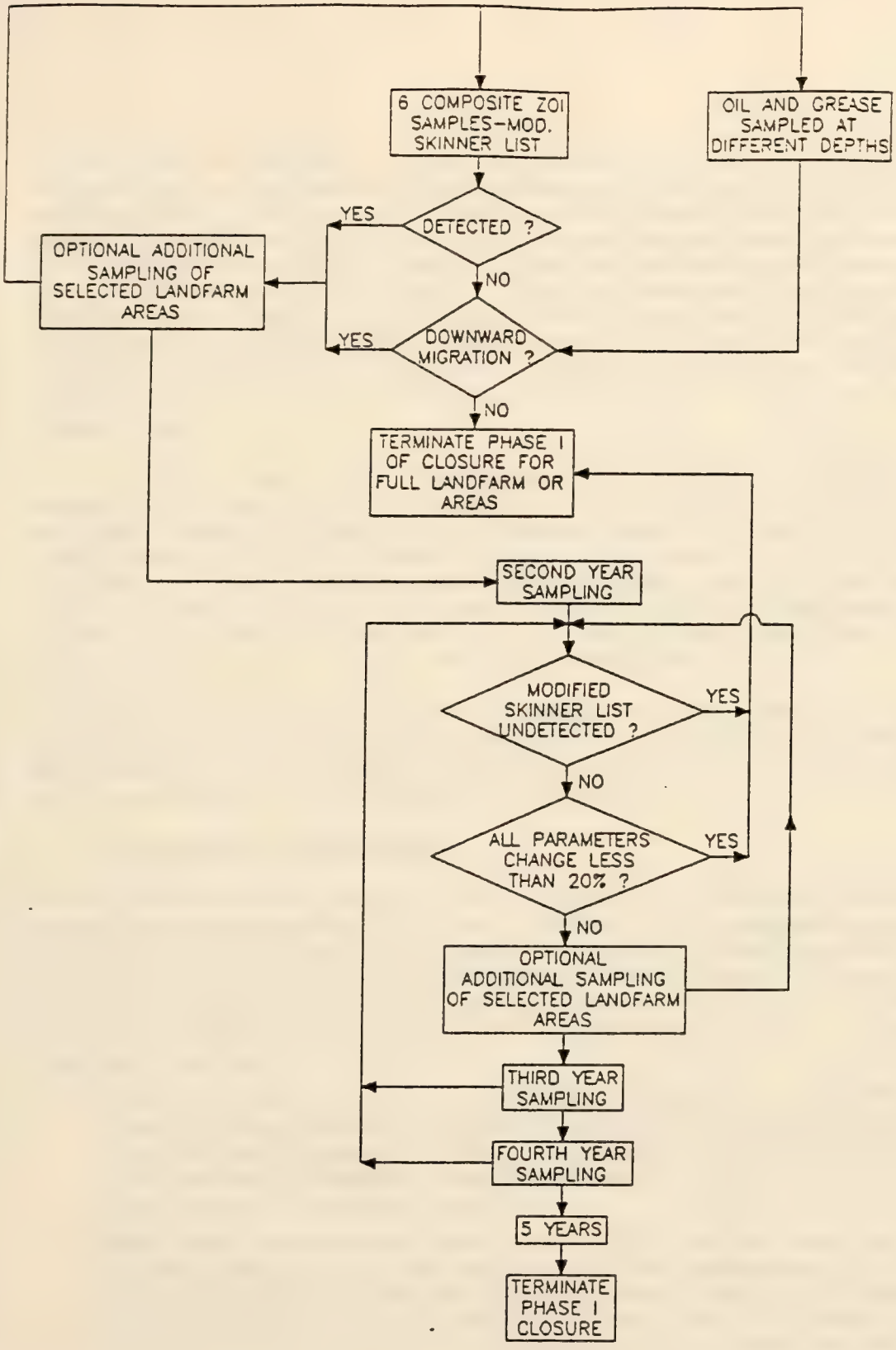
If second year sampling shows non-detectable modified Skinner list organics in the ZOI, or if there is no change in parameter concentrations greater than $\pm$ 20% (including oil and grease) between the first and second years, then Phase II of the closure can proceed. At the end of the second year, CENEX can elect to demonstrate that an area(s) meet the $\pm$ 20% criteria for passing into Phase II utilizing a minimum of three locations in an area.

The annual sampling will continue as in the paragraph above until either the Phase I criteria are met, or a total of five years pass. However, CENEX could elect to discontinue the annual sampling (with the exception of 60"-66" oil and grease analyses) and simply continue Phase I through the fifth year.

3.3 Phase II Closure

Phase II closure care will begin when the criteria stated in Section 3.2 are met. This could occur at different times or simultaneously for all areas.

The initial step of Phase II will consist of establishing a vegetative cover over the landfarm surface. The vegetative cover will consist of 30% western wheat grass, 30% farmway crested wheat grass, 30% sodar streambank grass, and 10% Fultz Alkali grass.



ERM-Southwest, inc.
NEW ORLEANS, LOUISIANA — HOUSTON, TEXAS

DATE 07/21/89 | W.O.NO. 3009A002G39

FIGURE 3–2
PHASE I CLOSURE CRITERIA
CENEX Land Treatment Facility
Laurel, Montana

R117

This grass cover will be seeded between March 15 and May 15, or August 15 and October 15 at a twenty (20) pounds per acre application rate. Prior to planting, the ground will be disked, harrowed and leveled by dragging. Since the proposed grasses require 12" of annual rainfall, fertilizer is not needed as the grass will be grown as a dryland crop. The success of the grass will be judged by its ability to prevent wind dispersal of landfarm soils. If weeds interfere with this, herbicides will be applied. The vegetative cover will not be grown for feed for animals whose products are consumed by humans, therefore it will not be a food-chain crop.

A 20' x 20' test plot with low oil and grease content will be seeded with the grass mixture noted above during the first spring of the Phase I period to demonstrate tolerance to landfarm conditions. In the event that no grasses in the mixture are tolerant of the landfarm conditions, other native grasses will be tested. The objective of the plot will be to demonstrate that a grass cover can be maintained of sufficient quality to prevent significant soil erosion and wind dispersal.

Closure will be completed when Phase II ends for all six areas. Activities associated with Phase II closure are conservatively estimated to occur within 180 days, but could be longer, depending on the season in which Phase II begins.

3.4 Area B05 Investigation

Boring B05 was executed as part of the land treatment demonstration reconnaissance survey. It was located in the western area of the northern half of the landfarm. It indicated the possible presence of waste constituents below the five foot treatment zone. As part of this closure, CENEX will further explore this area to define the extent of affected soils below the treatment zone. This will be done as follows:

1. The B05 boring location will be rebored to a depth of seven feet. Four seven-foot deep borings will be executed 25 feet to the north, south, east, and west of B05. Soil samples of the below treatment zone interval will be inspected visually for signs of contamination.

2. For those borings 25 feet from B05 in which affected soil are found, additional boring(s) will be advanced in a straight line defined by B05 and the affected boring. These borings will be placed at a distance of 50, 100, 150 feet, etc. from B05 until the limit of affected soil is found, or the landfarm boundary is reached. Additional borings can be executed between an affected and unaffected boring in order to better define the affected area, should CENEX choose to do so.

3. For those borings which were executed 25 feet away from B05 and in which affected soil is not found, an additional boring on a line half way between B05 and the clean boring will be executed to define the extent of affected soil.

Once the volume of affected below treatment zone soil has been determined, CENEX will develop a method to remediate this material. Options could include soil venting, bioremediation, excavation and landfarming of affected soils, etc.

4 - POST-CLOSURE PLAN

4.1 General

The post-closure plan for the landfarm will cover a period of 30 years. During the post-closure period, requirements are in effect for preservation of integrity of the closure system, monitoring of the system, and maintenance. The post-closure plan must be amended as necessary to reflect current practices and requirements.

The post-closure care period will begin when Phase II of the closure plan has been completed, approximately 6 months to 2 years after the final waste placement.

The probable post-closure operator will be:

CENEX
P.O. Box 909
Laurel, Montana 59044
Tel: 406-628-4311

The name, phone number and address of the post-closure operator will be determined and entered in to the plan at the time of closure.

4.2 Inspection Schedule

In order to maintain the integrity of the vegetative cover, monitoring wells, run-on and run-off control measures, and security, the following items will be checked on a quarterly basis.

- check for erosion
- check for ponding of water
- check for vegetative cover
- check surface drainage ditches for debris and clogging
- check above-grade portion of monitoring wells for structural integrity
- check berms for signs of deterioration
- inspect fencing
- inspect benchmarks

The inspection log for the above activities is shown in Table 4-1. This log will also be used for recording maintenance activities performed based on these inspections.

TABLE 4-1

Post Closure Inspection Report

CLOSURE: NLF Treatment Area

WEATHER CONDITIONS: _____

INSPECTION DATE: _____

TIME START: _____

INSPECTOR: _____

SUPERVISOR APPR: _____ DATE: _____

NO.	INSPECTION ITEM	CHECK LIST	PASS	FIX	REMEDIAL ACTION	DATE FIXED	PROCEDURE AND AMT. OF MAT'L. USED	REINSPECT. AND DATE
1	Visual inspection	1a. Grass cover 1b. Ponded water 1c. Surface depressions			-Approved Topsoil Fill -Fertilize -Seed			
2	Excessive erosion	2a. Eroded soil 2b. Barren areas			-Approved Topsoil Fill -Fertilize -Seed			
3	Vegetative growth (March - November)	3a. Barren areas 3b. Miscolored leaves 3c. Excessive moisture in soil			3a. Revegetate 3b. Soil analysis Add fertilizer if necessary or adjust soil pH 3c. Improve drainage			
4	Drainage ditches	4a. Soil and debris build up			4a. Clean ditch			
5	Monitor wells	5a. Check above-ground structural integrity			5a. Repair above ground without replacing entire well 5b. If problem is below grade, replace entire well			

COMMENTS _____

TABLE 4-1

Post Closure Inspection Report

CLOSURE: NLF Treatment Area

WEATHER CONDITIONS: _____

INSPECTION DATE: _____

TIME START: _____

INSPECTOR: _____

SUPERVISOR APPR: _____ DATE: _____

NO.	INSPECTION ITEM	CHECK LIST	PASS	FIX	REMEDIAL ACTION	DATE FIXED	PROCEDURE AND AMT. OF MAT'L. USED	REINSPECT. AND DATE
6	Fencing	6a. Check for holes and deterioration in wire fabric			6a. Replace as needed			
7	Run-on and Run-off Berms	7a. Check for deterioration			7a. Replace and compact material as needed Fertilize and seed.			
8	Benchmarks	8a. Check for signs of disturbance			8a. Resurvey as needed.			

COMMENTS _____

4.3 Ground Water and Soil Core Monitoring

A ground water monitoring program is required as part of the measures to detect any release of hazardous waste to the environment. The ground water data to be obtained for upgradient and downgradient wells at each sample event will be determined by the ground water assessment or a post-closure care Part B permit. Well locations can be seen in Figure 3-1. Post-closure monitoring will be performed according to the schedule determined by the ground water assessment program. During the post-closure care period, all monitoring data will be maintained on file at the refinery. All required statistical analyses (averaged replicate t-Test) will also be kept on file.

Reporting of ground water monitoring results to the State of Montana will be done via the annual generators report, in those years in which monitoring occurs.

Below treatment zones samples will be taken at six locations in the landfarm and monitored during the post-closure period according to the schedule presented in Table 4-2. Details of all monitoring procedures can be found in CENEX's interim status Ground Water and Unsaturated Zone Monitoring Plans.

TABLE 4-2

Post-Closure Soil Core Monitoring[1]

Locations: One randomly selected location per area. (Total of 6.) Same randomly selected locations to be used in subsequent samplings for composition purposes.

Sample Interval: 60" - 66"

Analyses: Principal Hazardous Constituents

Organics	Metals	Other
Volatiles	- Lead - Chromium	-pH -Extractable Hydrocarbon (Oil and Grease)
- Benzene - Ethylbenzene - Toluene - Xylenes (m,o,p)		
Semi-volatile Base/Neutral		
- Anthracene - Benzo(a)anthracene - Benzo(a)pyrene - Chrysene - 1-Methyl Naphthalene - Naphthalene - Phenanthrene - Pyrene		
Semi-volatile Acid-Extractable		
- Cresol (s) - 2-4-Dimethylphenol - Phenol		

[1] Five sample events during the post-closure care period. One sample event each at the end of years 1, 3, 7, 15, and 30 from the date on which post-closure starts.

4.4 Maintenance

Planned preventative and corrective maintenance activities and maintenance schedule are listed in Tables 4-3 and 4-5. Nonscheduled items that require maintenance will be identified on the inspection forms shown in Table 4-1. These forms will also serve as a record that maintenance items were implemented and the repair approved.

Ground water monitoring wells will be inspected during each sampling event. Any damage to locking caps, well casing, etc. will be corrected.

TABLE 4-3

Post-Closure Preventative Maintenance Activities

Activity	Purpose	Frequency
Fertilize cover grasses	Maintain healthy grass cover, prevent erosion, prevent pooling, (infiltration)	once
Visual inspection	Determine health of grass cover	1/mo.
Inspect fencing	Restrict access	1/mo.
Inspect and maintain run-on/run-off control berms	Prevent run-on and run-off	1/mo.
Inspect bench marks	Preserve relocatability of specific waste treatment areas	2/yr.
Inspect ground water wells	Insure well is locked and well casing is in good condition	2/yr.
Ground water monitoring	Determine if hazardous constituents have migrated into the upper-most aquifer	See Table 4-1
Soil core analyses	Monitor for waste constituents below the treatment zone.	See Table 4-2

TABLE 4-4

Post-Closure Corrective Maintenance Activities

Activity	Purpose	Frequency
Repair erosion damage with additional topsoil	prevent erosion, prevent pooling	As necessary
Reseeding and refertilization of eroded, bare areas	maintain integrity of grass cover	As necessary
Monitoring well replacement	maintain well integrity	Replace above-ground portion as necessary
Replace and compact material along berms	maintain run-on and run-off control	As necessary

5 - COST ESTIMATES

Table 5-1 is a cost estimate of closure expenses, and Table 5-2 is a cost estimate of post-closure care expenses.

Replaced original Table 5-1 w/this table on 9-29-89 as part of final modifications to CENEX Closure Plan. RR

TABLE 5-1
ESTIMATED LANDFARM CLOSURE COSTS
ALL COSTS ARE IN 1989 DOLLARS

Item	Units	Quantity	Estimated Unit Costs	Estimated Total Costs
1. Till landfarm surface once per month for twelve months (seasonal), assume 12 events	each	12	$ 500	$ 6,000
2. Collect/analyze soil for pH and nutrients	each	2	$ 195	$ 390
3. Fine grading and seeding including seed, and equipment	acre	22.5	$ 1,050	$ 23,625
4. Monthly inspections (2 yrs)	hrs	48	$ 30	$ 1,440
5. Equipment decontamination including 5 days of vacuum truck rental, hydroblaster, and labor	lump sum	1	$ 4,000	$ 4,000
6. Implementation of Ground Water Assessment Plan	each	1	$60,000	$ 60,000
7. Collect/analyze soil cores: (6 composite ZOI samples) analyses				
Commencement of Closure	each	6	$ 100	$ 600
End of each year for 2 years	each	12	$ 1,500	$ 18,000
(Six sets of three depths): Analysis				
End of each year for 2 years	each	36	$ 50	$ 1,800
Drilling	day	16	$ 1,375	$ 22,000
Samplings/report	hrs	130	$ 50	$ 6,500
8. Collect/examine soil cores (4 locations and B05)				
Drilling	day	4	$ 1,375	$ 5,500
Oil and Grease analyses (5,6 and 7th foot-5 borings)	each	15	$ 100 (a)	$ 1,500
Samplings/report	hrs	100	$ 50	$ 5,000
9. Final certification - Professional Engineer	each	5	$ 750	$ 3,750
	Subtotal 1			$ 160,105
	Administrative (5%)			8,005
	Subtotal 2			168,110
	Contingency (15%)			25,220
	Total			$ 193,330
			say	$ 193,000

(a) Fast turnaround price

Rev. 9/89

N766

TABLE 5-2

ESTIMATED LANDFARM POST-CLOSURE COSTS

Item	Required No. of Events	Estimated Units Costs	Total Post-Closure Costs
Fertilize cover grasses	1	$ 16,500	$ 16,500
Inspections	360	$ 60	$ 21,600
Ground water monitoring (5 events x 6 wells)			
Analyses	30	$ 450	$ 13,500
Sampling/report	5	$ 2,500	$ 12,500
Soil core monitoring (5 events x 6 locations)			
Analyses	30	$ 500	$ 15,000
Drilling	5	$ 5,500	$ 27,500
Sampling/report	5	$ 2,500	$ 12,500
		Subtotal 1	$ 119,100
		Administrative (5%)	5,955
		Subtotal 2	125,055
		Contingency (15%)	18,760
		30 Year Total	$ 143,815
			say $ 144,000

M563

6 - PERSONNEL TRAINING

6.1 Introduction

This plan documents the training required of personnel responsible for operation, inspection, monitoring, and maintenance of the hazardous waste landfarm facility throughout the closure and post-closure periods.

Classroom instruction and on-the-job training directed by the hazardous waste manager at CENEX's Laurel, Montana refinery is required of personnel closing the landfarm. This program is designed to enable them to operate these facilities properly and respond effectively to emergencies.

The training course defined in this plan is given to new operators (transferred or new employees) and is also reviewed annually (refresher course) with all personnel involved in the operation of the landfarm facility. This annual review also allows for the review of any changes to the various RCRA plans of which the operators should be aware. Records kept by the hazardous waste manager until closure of the hazardous waste facilities, as required by regulation, include job titles, qualifications and responsibilities, training programs and continuing hazardous waste education.

6.2 Training Course Outline

The following is an outline of the subjects covered by the hazardous waste training program at CENEX's Laurel, Montana refinery:

- RCRA Overview
- Hazardous Waste-General
- Hazardous Waste Applied to Landfarm
- Landfarm Operations and Training
- Post-Closure Inspection and Maintenance
- Contingency Plan.

This training will be in addition to other regular health and safety training that is provided at the Cenex facility.

6.3 Training Frequency

Facility personnel must successfully complete the training program within six months of assignment to the jobs related to the landfarm closure. Employees do not work in unsupervised positions until they have completed the training requirements. Facility personnel take part in an annual training review.

6.4 Training Records

Training records are kept on file at the refinery in the office of the Support Systems Engineer. These records are maintained until closure for current personnel and for three years from the date a former employee (whether transferred or terminated) last worked at the landfarm facility.

6.5 Summary

The Training Program outlined above is the means by which comprehensive, up-to-date information concerning all of the landfarm operations are conveyed to all personnel working in these areas. This allows for the proper operation of the facilities and the minimization of the effect of emergency situations. The program is designed to ensure that facility personnel are able to respond effectively to emergencies by familiarizing them with emergency procedures, emergency equipment, and emergency systems.

APPENDIX A

Plan Revision Log

PLAN REVISION LOG

Date of Issue of Revisions(s)	Pages Revised	Pages Added	Reason(s) for Revision(s) Note: Use all the space needed to provide an adequate explanation	Individual Responsible for Revisions(s)	Checked By

APPENDIX B

Deed Recordation

CENEX • Post Office Box 909 • Laurel, Montana • 59044-0909 • Phone (406) 252-9326

September 25, 1985

Head of Records
Clerk and Recorders Office
Yellowstone County Courthouse
Billings, Montana 59101

To Whom It May Concern:

Federal regulations (attached) require that industrial facilities handling certain wastes must record such activities on the deed of the facility property.

To comply with these regulations CENEX requests that the enclosed documents be attached to the property deed kept in your file. Should the property ever be made available for sale, any prospective purchasers will be informed in accordance with the Code of Federal Regulations, Title 40, Part 264.120 that future use of these areas is restricted persuant to federal law (Resource Conservation and Recovery Act).

Thank you for your cooperation.

Sincerely,

Louis J. Day
Refinery Manager

LJD/lt

Attachment

CENEX • Post Office Box 909 • Laurel, Montana • 59044-0909 • Phone (406) 252-9326

October 1, 1985

To Whom It May Concern:

Be it known to any perspective purchaser of the property in question, that said property was used for the treatment and disposal of hazardous wastes as defined under Title 40 of the Code of Federal Regulations, Part 261. This notification is affixed to this deed consistent with Section 264.120 of the same regulations.

As required under Title 40 of the Code of Federal Regulations, Part 264, Section 264.119, within 90 days after closure is completed, a survey plot indicating the location and dimensions of the disposal areas with respect to permanently surveyed benchmarks will be submitted to the local land authority and to the EPA Regional Administrator. The type and quantity of hazardous wastes disposed of in each area will also be submitted at that time.

The areas of treatment and disposal are shown on the attached plot plan.

The potential purchaser of said property is hereby notified that use of this property is restricted to the conditions found at Title 40 of the Code of Federal Regulations, Part 264, subsections 264.117(c) and 264.120.

Louis J. Day
Refinery Manager

RONALD C. FAUGHT
NOTARY PUBLIC for the State of Montana
Residing at Laurel, Montana
My Commission Expires July 12, 1986

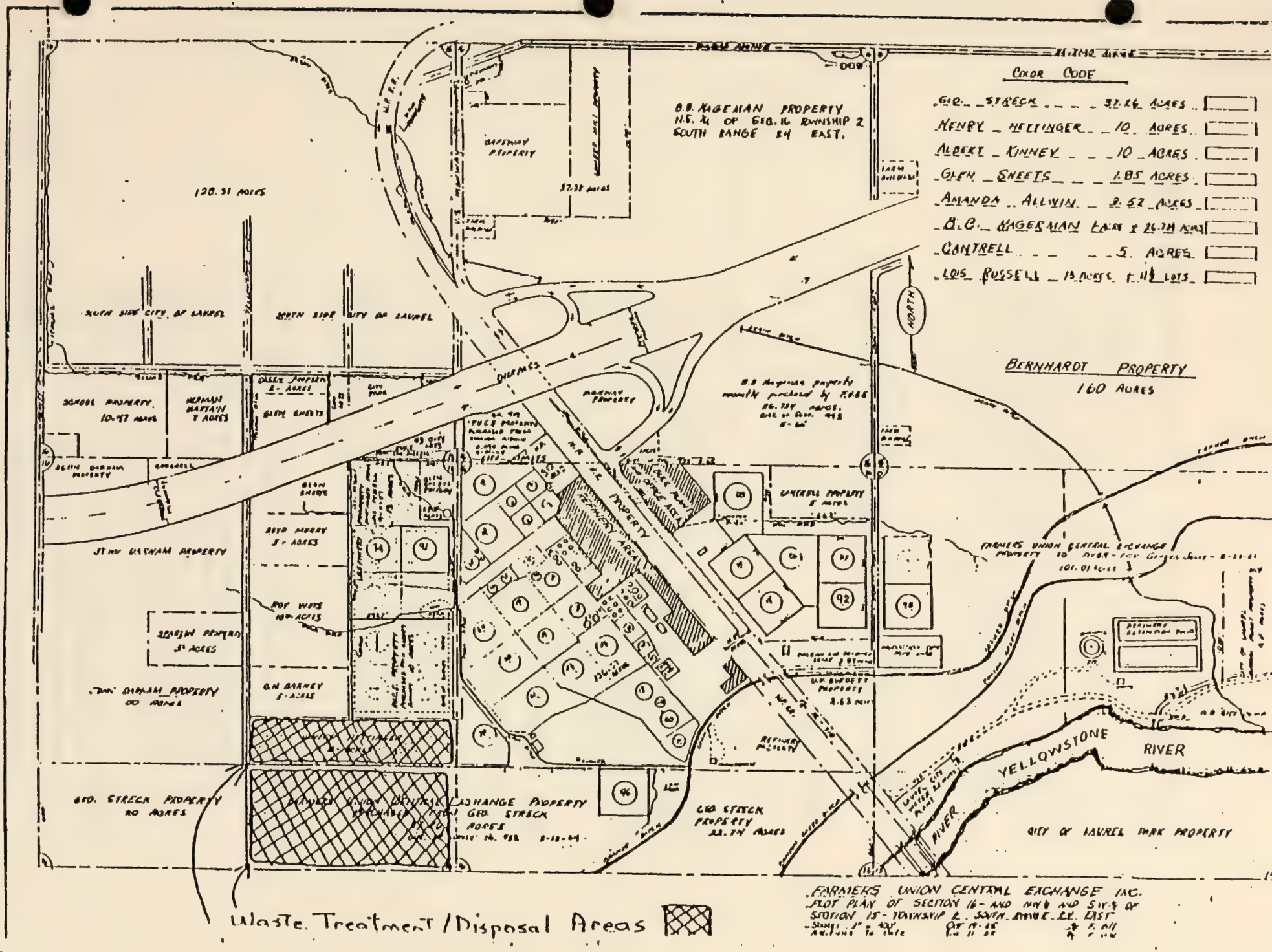
STATE OF MONTANA)
: ss.
County of Yellowstone)

On this 1st day of October, 1985, before me, the undersigned, a Notary Public for the State of Montana, personally appeared Louis J. Day to me known to be the Refinery Manager of the corporation that executed the within instrument and acknowledged to me that such corporation executed the same.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my official seal the day and year in this certificate first above written.

(SEAL)

Notary Public for the State of Montana
Residing at Billings, Montana
My Commission expires: July 12, 1986


Color Code
Geo. Streck 32.26 Acres
Henry Heetinger 10 Acres
Albert Kinney 10 Acres
Glen Sheets 1.85 Acres
Amanda Allwin 2.52 Acres
B.C. Hagerman East & 26.74 Acres
Cantrell 5 Acres
Lois Russell 13 Acres & 11½ Lots
B.B. Hageman property
N.E. ¼ of Sec. 16 Township 2 South Range 24 East.
Bernhardt Property
160 Acres
North
Yellowstone River
City of Laurel Park Property
Geo. Streck Property 32.74 Acres
Geo. Streck Property 10 Acres
Waste Treatment / Disposal Areas
Farmers Union Central Exchange Inc.
Plot Plan of Section 16 and NW¼ and S½ of Section 15 - Township 2 South Range 24 East

264.117 Post-Closure Care and use of Property

(c) Post-closure use of property on or in which hazardous wastes remain after closure must never be allowed to disturb the integrity of the final cover, liner(s), or any other components of any containment system, or the function of the facility's monitoring systems, unless the Regional Administrator finds that the disturbance:

(1) Is necessary to the proposed use of the property, and will not increase the potential hazard to human health or the environment; or

(2) Is necessary to reduce a threat to human health or the environment.

264.120 Notice in Deed to Property

(a) The owner of the property on which a disposal facility is located must record, in accordance with State law, a notation on the deed to the facility property - or on some other instrument which is normally examined during title search - that will in perpetuity notify any potential purchaser of the property that:

(1) The land has been used to managed hazardous wastes;

(2) Its use is restricted under 264.117(c); and

(3) The survey plat and record of the type, location, and quantity of hazardous wastes disposed of within each cell or area of the facility required in 264.119 have been filed with the local zoning authority or the authority with jurisdiction over local land use and with the Regional Administrator of the Environmental Protection Agency.

(b) If at any time the owner or operator or any subsequent owner of the land upon which a hazardous waste facility was located removes the waste and waste residues, the liner, if any, and all contaminated underlying and surrounding soil, he may remove the notation on the deed to the facility property or other instrument normally examined during title search, or he may add a notation to the deed or instrument indicating the removal of the waste.

(Comment: On removing the waste and waste residues, the liner, if any, and the contaminated soil, the owner or operator, unless he can demonstrate in accordance with 261.3(d) of this Chapter that any solid waste removed is not a hazardous waste, becomes a generator of hazardous waste and must manage it in accordance with all applicable requirements of Parts 262-266 of this Chapter.)

264.119 *Notice to Local Land Authority*

Within 90 days after closure is completed, the owner or operator of a disposal facility must submit to the local zoning authority or the authority with jurisdiction over local land use and to the Regional Administrator a survey plat indicating the location and dimensions of landfill cells or other disposal areas with respect to permanently surveyed benchmarks. This plat must be prepared and certified by a professional land surveyor. The plat filed with the local zoning authority or the authority with jurisdiction over local land use must contain a note, prominently displayed, which states the owner's or operator's obligation to restrict disturbance of the site as specified in 264.117(c). In addition, the owner or operator must submit to the local zoning authority or the authority with jurisdiction over local land use and to the Regional Administrator a record of the type, location, and quantity of hazardous wastes disposed of within each cell or area of the facility. For wastes disposed of before these regulations were promulgated, the owner or operator must identify the type, location and quantity of the wastes to the best of his knowledge and in accordance with any records he has kept. Any changes in the type, location, or quantity of hazardous wastes disposed of within each cell or area of the facility that occur after the survey plat and record of wastes have been filed must be reported to the local zoning authority or the authority with jurisdiction over local land use and to the Regional Administrator.

WARRANTY DEED BOOK 1210 PAGE 592

FOR A VALUABLE CONSIDERATION, receipt of which is hereby acknowledged on this 2 day of AUGUST, 1979, the undersigned, HENRY HETTINGER and IRENE HETTINGER, husband and wife of Laurel, Montana hereby grants unto FARMERS UNION CENTRAL EXCHANGE, INCORPORATED of South St. Paul, Minnesota, the hereinafter described real estate situated in Yellowstone County, Montana, to-wit:

The South-half of the North-half of the Southeast Quarter of the Southwest Quarter (S½N½SE¼SW¼) of Section Sixteen (16), Township Two South (2), Range Twenty-four (24) East, Yellowstone County, Montana M.P.M., consisting of ten (10) acres more or less, according to the plat --- with appurtenances ---

TO HAVE AND TO HOLD unto the Grantee and to its successors and assigns forever, subject, however, to:

(a) All reservations and exceptions of record and in patents from the United States and the State of Montana;

(b) All existing easements, rights of way, building use restrictions and zoning ordinances;

(c) Taxes and assessments for the second half of the year 1978 and subsequent years.

EXCEPT with reference to items referred to in paragraphs (a) to (c) above, this Deed is given with the usual covenants expressed in Section 30-11-110, Montana Codes Annotated, 1978.

IN WITNESS WHEREOF, the Grantors have executed this instrument the day and year first above written.

Henry Hettinger
HENRY HETTINGER

Irene Hettinger
IRENE HETTINGER

STATE OF MONTANA)
: ss.
County of Yellowstone)

On this 2 day of AUGUST, 1979, before me the undersigned, a Notary Public for the State of Montana, personally appeared, HENRY HETTINGER and IRENE HETTINGER, husband and wife, known to me to be the persons whose names are subscribed to the within instrument and acknowledged to me that they executed the same.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my official seal the day and year in this certificate first above written.

Norman F. Schulte
Notary Public for the State of Mt.
Residing at: Laurel, Montana
My commission expires: 2/17/81

NOTARY PUBLIC for the State of Montana
Residing in Yellowstone County
Expiration Date: Feb. 17, 1981

THIS INDENTURE, made this 19 day of February, 1964, between GEORGE STRECK, Jr. and MARIE STRECK, husband and wife, of Laurel, Montana, Parties of the First Part and FARMERS UNION CENTRAL EXCHANGE, INC., a corporation of St. Paul, Minnesota, Party of the Second Part;

W I T N E S S E T H :

THAT the said Parties of the First Part, for and in consideration of the sum of One Dollar and other valuable consideration ($1.00 o.v.c.) lawful money of the United States of America to them in hand paid by said Party of the Second Part, the receipt whereof is hereby acknowledged; do by these presents grant, bargain, sell, convey, warrant and confirm unto the said Party of the Second Part, and to its heirs and assigns forever, the hereinafter described real estate situated in the County of Yellowstone, State of Montana, to-wit:

Beginning at the S¼ Corner of Section 16, Township 2 South, Range 24 East, M.P.M., thence North 89°57' West along the South line of said Section 16, a distance of 1284.25 feet to the Southwest corner of S½SE¼SW¼ of said Section 16; thence North 00°30' West along the West line of said S½SE¼SW¼ which is also the center line of Yellowstone Avenue extended a distance of 661.70 feet to the Northwest corner of said S½SE¼SW¼, thence -

South 89°59' East along the North line of said S½SE¼SW¼ a distance of 1289.45 feet to an intersection with the N-S mid section line; thence continuing South 89°59' East along the North line of S½SW¼SE¼ said Section 16, a distance of 1306.85 feet to a point on the West bank of Cramer Ditch; thence South 08°56' West along said West bank a distance of 355.83 feet; thence South 30°52' West a distance of 64.60 feet; thence South 60°00' West, a distance of 345.22 feet; thence South 66°14'West a distance of 206.30 feet to an intersection with the South line of said Section 16; thence North 89°57' West along the said South line a distance of 730.10 feet to the point of beginning, containing 37.260 acres, as more fully contained and set forth in Certificate of Survey No. 952, filed of record in the office of the County Clerk and Recorder of Yellowstone County, Montana, which property can be otherwise described hereafter as Tracts One (1) and Two (2) of Certificate of Survey No. 952, as filed of record in the office of the Clerk and Recorder of said County.

TOGETHER with all and singular the hereinbefore described premises together with all tenements, hereditaments, and appurtenances thereto belonging or in anywise appertaining, and the reversion and reversions, remainder and remainders, rents, issues, and profits thereof; and also all the estate, right, title, interest, right of dower and right of homestead, possession, claim and demand whatsoever, as well in law as in equity, of the said Parties of the First Part, of, in or to the said premises, and every part and parcel thereof, with the appurtenances thereto belonging, TO HAVE AND TO HOLD, all and singular the

CLOSURE AND POST-CLOSURE PLAN
OLD LANDFARM (OLF) AREA

Farmers Union Central Exchange, Inc.
(CENEX)
Laurel, Montana Refinery

Dannelle Belhateche

J. Martin Briggs, P.E.

Brian P. Flynn, P.E.
Principal

September 7, 1990

W.O. #30-11

Prepared By:

ERM-SOUTHWEST, INC.
16000 Memorial Drive, Suite 200
Houston, Texas 77079
(713) 496-9600

TABLE OF CONTENTS

Section		Page
1	INTRODUCTION	1-1
	1.1 Background	1-1
	1.2 Scope and Objectives	1-1
2	GENERAL PLAN REQUIREMENTS	2-1
	2.1 Plan Availability	2-1
	2.2 Revisions to Plan	2-1
	2.3 Equipment Decontamination	2-1
	2.4 Maximum Waste Inventory	2-1
	2.5 Closure and Post-Closure Certification	2-1
	2.6 Deed Recordation	2-2
	2.7 Estimated Closure Date	2-2
3	CLOSURE PLAN	3-1
	3.1 Phase I Closure	3-1
	3.1.1 Waste at Depth Reconnaissance Survey	3-1
	3.1.2 Bioremediation of Treatment Zone Soils	3-6
	3.1.3 Phase I Closure Schedule	3-6
	3.1.4 Landfarm Operation	3-9
	3.2 Phase I Closure Criteria	3-12
	3.3 Phase II Closure	3-16
4	POST-CLOSURE PLAN	4-1
	4.1 General	4-1
	4.2 Inspection Schedule	4-1
	4.3 Ground Water and Soil Core Monitoring	4-1
	4.4 Maintenance	4-4
5	COST ESTIMATES	5-1
6	PERSONNEL TRAINING	6-1
	6.1 Introduction	6-1
	6.2 Training Course Outline	6-2
	6.3 Training Frequency	6-2
	6.4 Training Records	6-2
	6.5 Summary	6-2

APPENDIX A - Soil Core Analysis

APPENDIX B - Plan Revision Log

APPENDIX C - Deed Recordation

CLOSURE AND POST-CLOSURE PLAN
OLD LANDFARM (OLF) AREA

Farmers Union Central Exchange, Inc.
(CENEX)
Laurel, Montana Refinery

1 - INTRODUCTION

1.1 Background

The CENEX Refinery located in Laurel, Montana used land treatment for treatment and disposal of hazardous wastes generated as a result of crude refining operations until November 7, 1988.

The regulated hazardous waste facility included a 30-acre land treatment area (landfarm) for the treatment and disposal of a mixture of API/DAF sludges plus leaded tank bottoms. This facility currently has "interim status" under the hazardous waste regulations. However, during a Land Treatment Demonstration Reconnaissance Survey involving an area encompassing approximately eight acres at the northern boundary of the facility called the New Landfarm Area (NLF), the presence of hazardous waste constituents at a depth slightly greater than five feet was discovered. This made it infeasible for an operating Part B permit to be issued for this hazardous waste treatment unit. Thus, waste disposition to this unit ceased on November 7, 1988 in recognition that an operating Part B would not be issued. Subsequently, a closure plan for the entire landfarm was submitted to the Montana (DHES) on July 21, 1989. CENEX now wishes to formally close the remainder of the inactive facility, or Old Landfarm (OLF) area in two phases, and then place the unit in post-closure care. Soil boring analytical data collected in 1985 for the OLF is presented in Appendix A.

This plan outlines the method of closure and post-closure care for the Old Landfarm area of the facility. The Closure and Post-Closure Care Plan for the New Landfarm (NLF) portion only of this facility was preliminarily approved in a letter dated May 18, 1990 with some revisions to the Post-Closure Care Plan required. The Closure and Post-Closure Care Plan for the OLF area is written to meet the requirements of the Resource Conservation and Recovery Act (RCRA) of 1976 and the 1984 amendments as implemented by the State of Montana under EPA authorization.

1.2 Scope and Objectives

The RCRA regulations require that hazardous waste treatment, storage and disposal facilities have written closure plans available for inspection. These plans specify, for each facility,

when it is expected to be closed, the sequence and scheduling of steps to completely close the facility, the maximum hazardous waste material inventory and extent of the unclosed portion of the facility during its lifetime, decontamination procedures, etc. The intent of the plan is to define closure steps to ensure closure is done in such a manner as to avoid release of hazardous materials to the environment.

A post-closure plan is required for each "facility or part of a facility at which hazardous waste is intentionally placed into or on any land or water and at which waste will remain after closure". The post-closure period normally lasts for thirty years.

Specific elements of each plan include ground water monitoring, maintenance of monitoring and waste containment equipment, and deed restrictions on subsequent land use.

U574

2 - GENERAL PLAN REQUIREMENTS

2.1 Plan Availability

This plan is available at the office of:

Support Systems Engineer
CENEX
Box 909
Laurel, Montana 59044

2.2 Revisions to Plan

During the implementation of this closure and post-closure plan, it may become necessary to modify it due to unforeseen circumstances, changes in regulations, etc. If this becomes necessary, the Montana DHES will be contacted and changes to this plan will be documented in writing. Any changes made will be listed in Appendix B to this plan.

2.3 Equipment Decontamination

All trucks and tilling equipment associated with the landfarm facility will be decontaminated by hydroblasting within the landfarm area.

2.4 Maximum Waste Inventory

We have estimated that the hazardous waste inventory applied to the landfarm is approximately 5,520 dry tons. This includes both the OLF and NLF.

2.5 Closure and Post-Closure Certification

Closure will be certified by a CENEX representative and an independent qualified soil scientist or registered Professional Engineer within sixty days of the completion of Phase II of the closure. Certification will consist of a review of operating records collected during the life of the facility, inspection of the vegetative cover and inspection of decontaminated equipment.

Within sixty days of the completion of the post-closure care period, a certification signed by CENEX and an independent registered professional engineer or qualified soil scientist will be sent to Montana DHES. This certification will show that post-closure care was performed in accordance with this plan. If there were any exceptions to the plan, they will be noted.

U574

2.6 Deed Recordation

A notation has been placed in the deed records for the facility that will notify in perpetuity any potential purchasers of the property that the land has been used to manage hazardous wastes and that its use is restricted. A copy of the deed recordation is included in Appendix C.

Within 90 days after Phase II of the closure is completed, CENEX will submit to the County Clerk and to the State of Montana's Department of Health and Environmental Sciences, a survey plat indicating the location and dimensions of the landfarm with respect to permanent surveyed bench marks prepared and certified by a professional land surveyor. This plat will contain a note which states CENEX's obligation to restrict disturbance of the site. A record of the type, location, and quantity of hazardous wastes disposed of within the landfarm area will be submitted with the survey plat.

2.7 Estimated Closure Date

Closure will begin upon approval of this plan by Montana DHES. The schedule for closure and post-closure will be dictated by the degradation rate of organic compounds in the facility. Degradation of organics will require an unknown time period, depending upon the amount of deeper buried material requiring bioremediation. At completion of degradation of organics, approximately 180 days to one year will be required for establishment of the vegetative cover, depending on the season in which Phase II of the closure is completed.

Closure may be certified after placement of the vegetative cover, but prior to its establishment, if the establishment should require more than one growing season. If so, conditions will be placed upon the closure certification to require the vegetative cover be inspected and re-seeded as necessary until the vegetation is able to reproduce.

3 - CLOSURE PLAN

The CENEX landfarm is located on a 30 acre tract of land within the refinery property boundary. Excluding the land utilized for access roads and monitoring wells, approximately 75% of this 30 acres (or 22.5 acres) has been utilized for land treatment of hazardous wastes generated at the refinery.

The landfarm is divided into two sections. The New Landfarm (NLF) area encompasses approximately eight acres at the northern boundary of the landfarm (see Figure 3-1). This area actively received wastes for eight years. The remainder of the landfarm, or Old Landfarm (OLF) area, has been inactive since 1981. Soil core samples were analyzed in 1985 and the results are presented in Appendix A.

Presently, the placement of wastes at the NLF has been discontinued as of November 1988. A closure plan for the NLF has been approved by the State of Montana Department of Health and Environmental Services (DHES). This closure plan will therefore address only the Old Landfarm, an area encompassing approximately fifteen acres.

Closure of the OLF will be accomplished by in-situ biological treatment. The specific goals of this treatment technique include biological degradation of oil and grease levels to one percent by weight, reduction of hazardous organic constituents to the target levels outlined in Section 3.2 (Phase I Closure Criteria), and immobilization of metals.

This Closure Plan will be completed in two phases. Phase I and Phase II of the closure plan will be implemented as described below.

Phase I: Waste at Depth Reconnaissance Survey, followed by continued bioremediation of waste remaining in the OLF

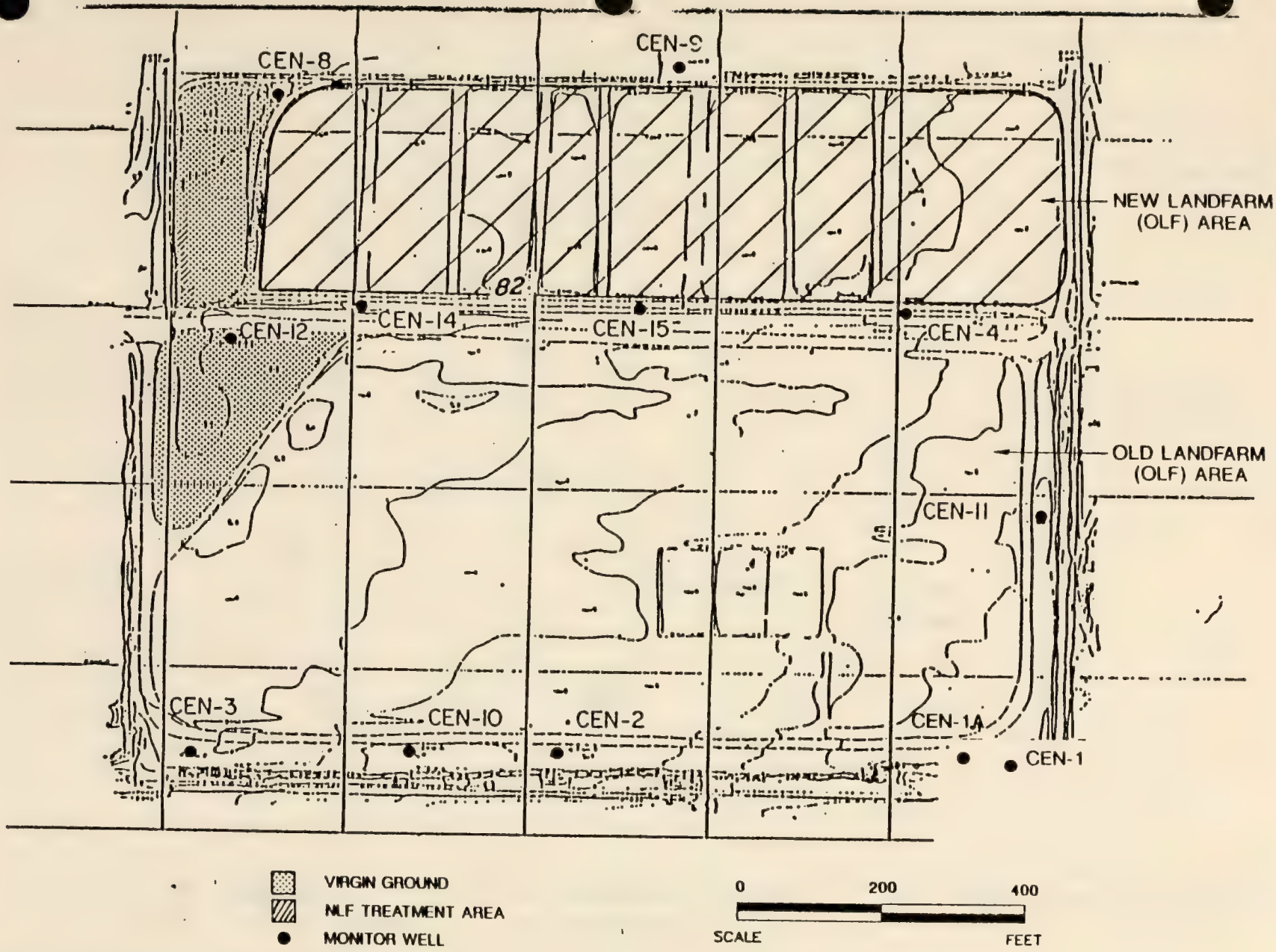
Phase II: Stabilization of the land treatment area and establishment of a vegetative cover

3.1 Phase I Closure

3.1.1 Waste at Depth Reconnaissance Survey

In order to address wastes which may remain buried at depth in the OLF, a waste reconnaissance survey will be performed in the areas shown in Figure 3-2. The OLF will be divided into five excavation and treatment sections. In each section, the approximate locations outlined in Figure 3-2 will be used as a guide for exploratory excavation using a backhoe. One section will be surveyed at a time,

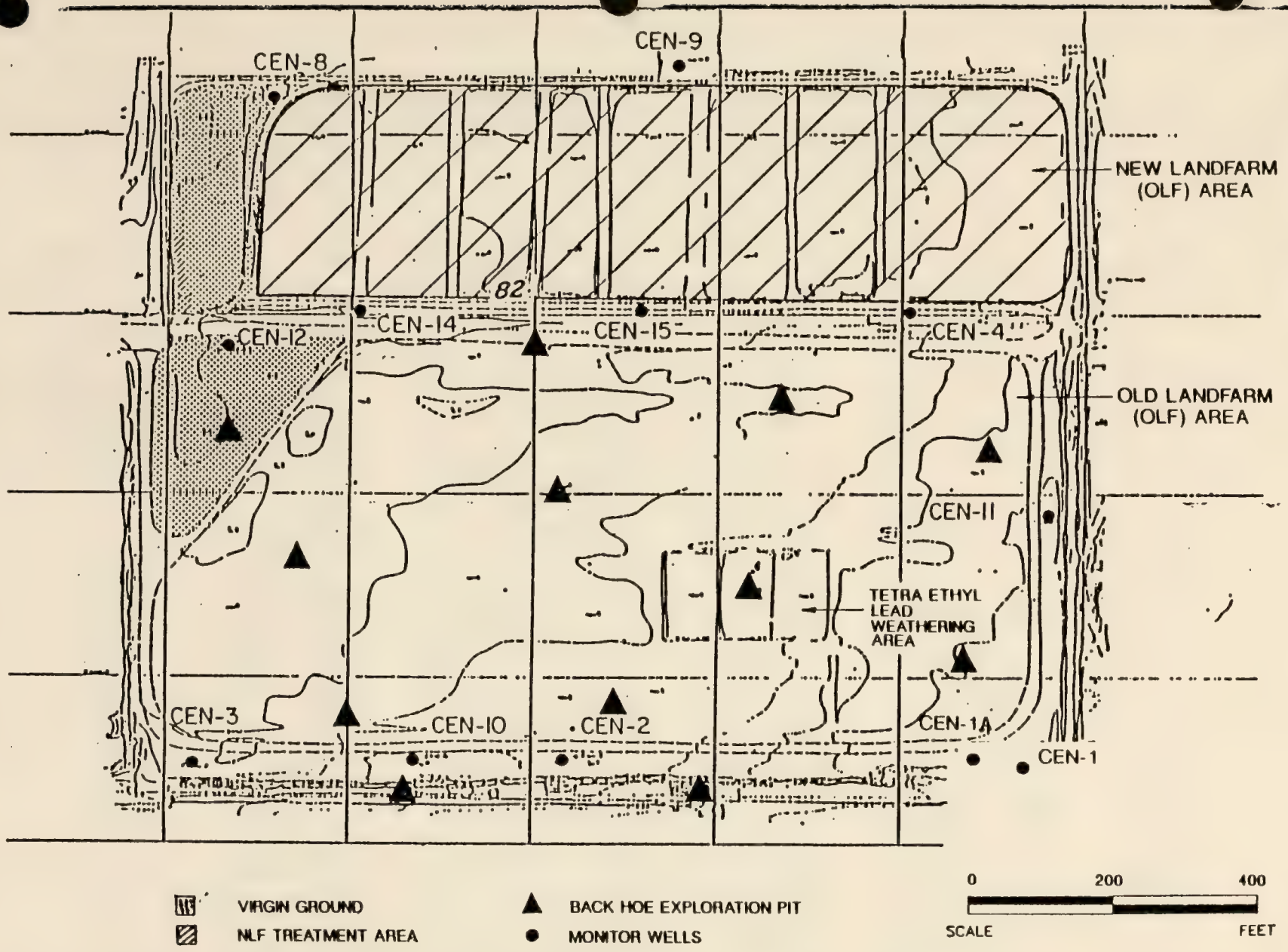
U574



ERM-Southwest, inc.
NEW ORLEANS, LOUISIANA HOUSTON, TEXAS

DATE 8/27/90 W.O.NO. 3011A017

FIGURE 3-1
CENEX REFINERY
LANDFARM TREATMENT AREA



ERM-Southwest, inc.
NEW ORLEANS, LOUISIANA HOUSTON, TEXAS

DATE 8/27/90 W.O.NO. 3011A018

FIGURE 3-2
CENEX REFINERY
PROPOSED WASTE RECONNAISSANCE SURVEY LOCATIONS
OLF TREATMENT AREA
LANDFARM TREATMENT AREA

with the remaining sections serving as the treatment area for excavated wastes, if any. It should be noted that the dimensions of these survey sections may vary depending on the actual amount of material removed during excavation, as this will affect the surface area required for treatment.

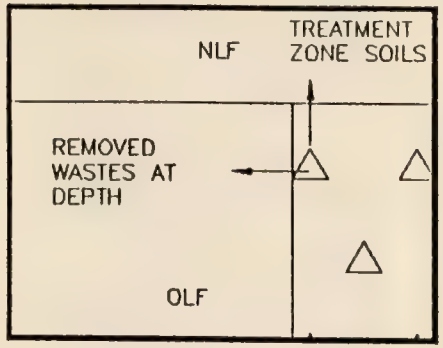
The area between the runoff control berm and the south fence line will be investigated first. If waste is found with an oil and grease content greater than 1%, then the material will be removed to the NLF until unaffected soil is reached. The excavation will then be backfilled with offsite soil that has been checked to insure it has less than 1% oil and grease. Then the new monitor wells will be placed along the fence line (CEN-2A, CEN-10A, CEN-3A and CEN-1B).

Initially, the treatment zone soil layer, as defined in the Land Treatment Engineering Report, in any one section will be excavated as shown in Figure 3-3. In order to allow for continued bioremediation of these soils, the excavated material will be placed temporarily in the NLF. This material will be tilled in with the NLF treatment soils and treated in a similar manner.

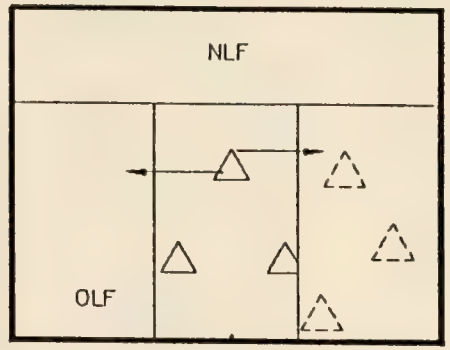
The exposed areas will then be excavated to a depth of at least eight feet from the ground surface, and samples retained for oil and grease analysis. If, during excavation, wastes are found containing greater than 1% oil and grease, excavation will continue until unaffected underlying soil is reached. The excavated material, along with any accumulated liquids or affected underlying soils, will be removed and spread on top of surficial soils in the remaining sections of the OLF for treatment. To maximize biodegradation of these wastes, affected material will be spread over the existing surficial soils at a maximum thickness of twelve inches.

Biodegradation of wastes in the new zone of treatment will be maximized by proper landfarming techniques, and soils will be analyzed for oil and grease. When the oil and grease concentration in the upper twelve inches is less than 1 %, composites from this zone will be collected and analyzed for the closure criteria discussed in section 3.2. If the soil meets the closure criteria, the treated material will be used to refill exposed excavation trenches.

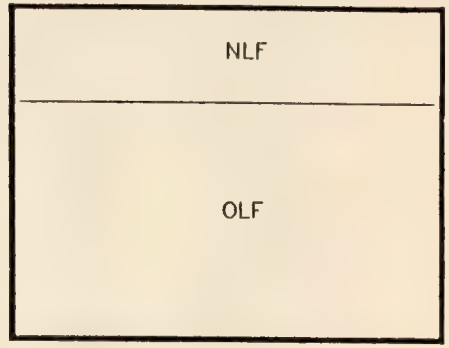
The waste reconnaissance survey will then continue in the next section of the OLF, with placement of the existing treatment zone soil layer in completed sections of the OLF, or in the NLF, for continued of biodegradation.



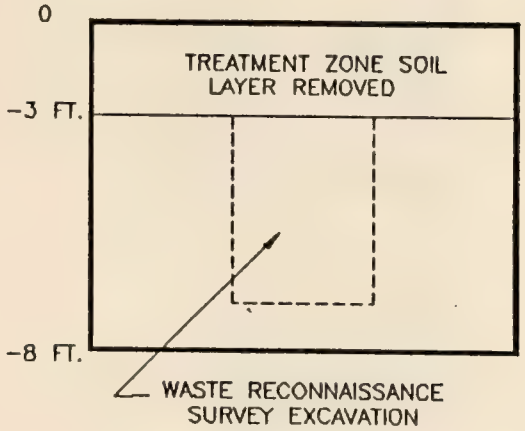
(1)
INITIAL EXCAVATION & BIODEGRADATION

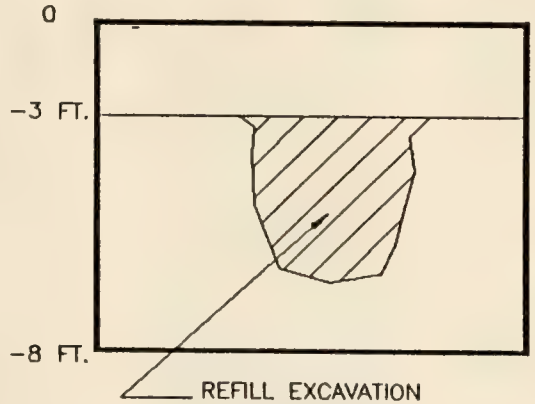


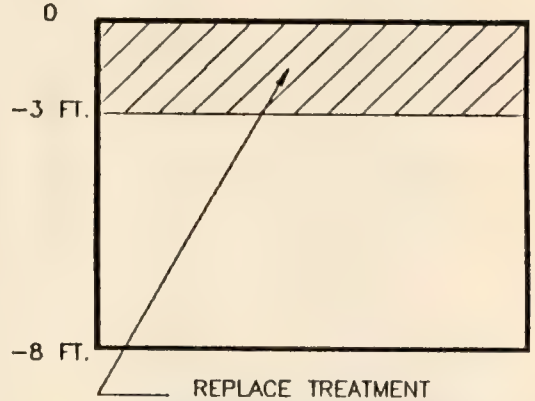
(2)
CONTINUING EXCAVATION



(3)
BIODEGRADATION OF TREATMENT ZONE SOILS







ERM-Southwest, inc.
NEW ORLEANS, LOUISIANA HOUSTON, TEXAS

DATE 08/27/90 | W.O.NO. 3011A016H90

FIGURE 3-3
WASTE AT DEPTH RECONNAISSANCE SURVEY AND TREATMENT
OLF TREATMENT AREA
Cenex Refinery
Laurel, Montana

If bulk scrap material, or any other material unsuitable for biological treatment, is encountered during excavation, these wastes will be cleaned of any oil and grease, and the scrap material sent for off-site disposal. The oily residue, if any, will then be applied to an active portion of the landfarm for treatment.

If during excavation of buried wastes it should become less economical to continue excavation to reach unaffected underlying soils, alternatives to surface treatment of these wastes will be considered.

3.1.2. Bioremediation of Treatment Zone Soils

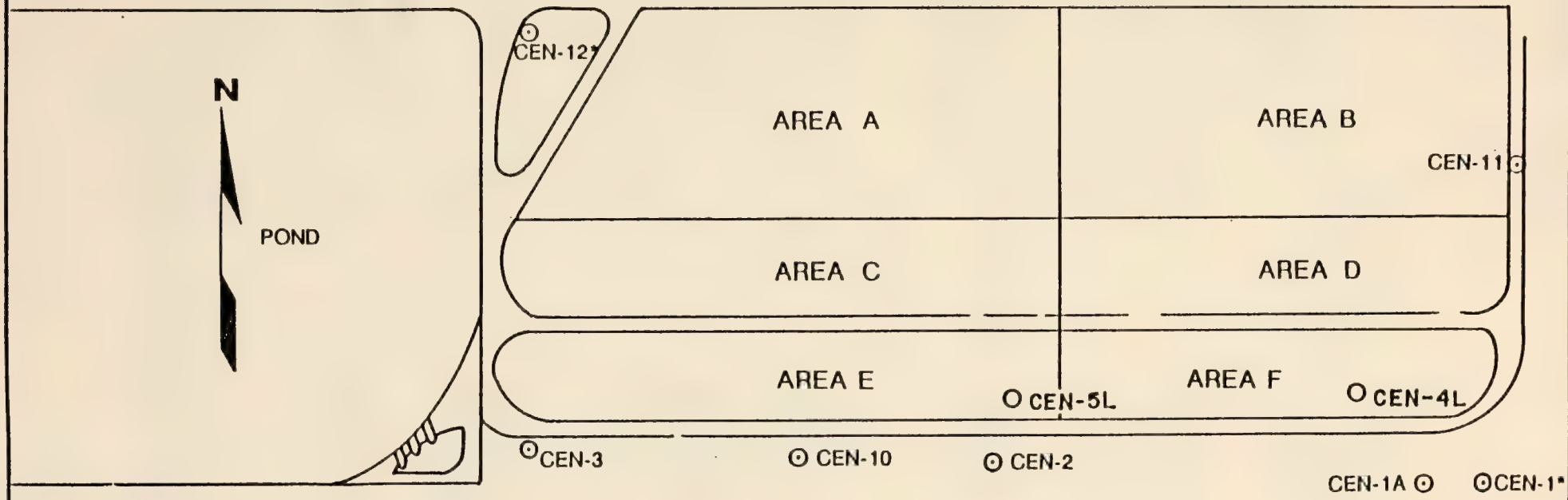
The landfarm will be divided into treatment sections to be sequentially remediated and revegetated. The proposed location of these treatment sections is shown in Figure 3-4, but may vary based on results of the waste reconnaissance surveys. Bioremediation of treatment zone soils will be performed using normal landfarming procedures.

Samples of the soil will be collected and analyzed for oil and grease. Bioremediation will continue using normal landfarming procedures until soil samples indicate a level of oil and grease of less than 1 %. When analyses indicate oil and grease levels less than 1 %, composite samples will be taken from the Zone of Incorporation (ZOI) soils and analyzed for the closure criteria discussed in section 3.2 When the closure criteria for Phase I has been met, Phase II of the closure plan will be initiated.

3.1.3 Phase I Closure Schedule

Phase I of the closure period will begin immediately after approval of this plan and will consist of routine operation of this landfarm until the Phase I Closure criteria are met (see Section 3.2) for existing surface soils and oil and grease levels are reduced to 1% or less for bioremediation soils.

Data available from other refinery landfarms indicates that 70 to 90 percent of the applied waste degrades each year (if frost does not occur). For the CENEX Refinery, where freezing conditions could conceivably occur 6 months per year, the Phase I closure period may continue approximately two years or more, i.e. enough time to allow at least two summers of biological activity. Over 180 days is requested for closure as a result of the time required to biologically stabilize the waste. Table 3-1 presents Phase I closure maintenance and inspection activities which will be done current with Phase I closure of the NLF area.



LEGEND

- ○ CEN-2L PERMANENT LYSIMETER LOCATION
- ⊙ CEN-1A GROUND WATER MONITORING WELL
- * NOT USED

NOTE

CEN-IAL WAS PREVIOUSLY LABELLED CEN-LS..

0 100 200 300 400
SCALE FEET

ERM-Southwest, inc.
NEW ORLEANS, LOUISIANA HOUSTON, TEXAS

DATE 8/27/90 | W.O.NO 3011A019

FIGURE 3-4
SAMPLES LOCATIONS AND AREAS
CENEX OLF TREATMENT AREA
Laurel, Montana

TABLE 3-1

Landfarm Closure Maintenance Activities

Activity	Purpose	Frequency
Phase I:		
Disk Active Areas	Maintain aerobic soil conditions	1/mo (seasonally)
Check soil pH/add lime (if needed)	Maintain pH $\geq$ 6.0 and $\leq$ 9.0	1/yr and within 30 days of start of closure
Check soil carbon content versus NPK/fertilize (if needed)	Nutrient addition Maintain C/N/P/K ratio of 100/2/2/2	1/yr and within 30 days of start of closure
Inspect run-on/run-off berms	Detect deterioration	1/mo
Collect/analyze soil	Determine when treatment is complete	2/yr
Ground Water Monitoring	Determine quality of uppermost aquifer below treatment area	2/yr
Unsaturated Zone Monitoring	Determine quality of soil pore water	once only (90 days after final waste placement) (a)
Soil Core Analysis	Monitor for waste constituents in soil column	1/yr
Phase II:		
Seed Grass	Establish vegetative cover	once only

NOTE:

(a) This activity was completed during the May 1989 sampling event and reported in the "Unsaturated Zone and Ground Water Monitoring Report; 7th Year, 1st Half 1989"; dated July 21, 1989.

3.1.4 Landfarm Operation

The bioremediation operations will take place within the existing confines of the OLF area. Landfarm operations will include excavation, tilling and compaction. Typical landfarming equipment capable of excavating, hauling, dumping, mixing and turning of soil, and application of appropriate nutrients will be used.

During Phase I of the closure period, the landfarm will be operated in the following manner:

1. All operations (including pH control) necessary to maximize degradation, transformation, or immobilization of hazardous constituents within the treatment zone will continue until closure is completed. This will include tillage, nutrient addition (if required) and moisture control as required. At a minimum, nutrients shall be maintained at the following levels:

   50 ppm nitrogen
   20 ppm phosphorus

   Nitrogen shall be applied as ammonium fertilizer to limit losses due to nitrate leaching.

   Composite soil samples, collected from the top 8" of soil in each treatment section, will be analyzed annually (as well as within 30 days of the start of Phase I closure) to monitor soil pH, soil TOC, nutrients and the modified Skinner List shown in Table 3-2. The soil sample will be analyzed at a soils/agricultural laboratory to determine if the appropriate nutrients are contained in the soil. The nutrient requirement will be based upon a sufficient supply of nitrogen, phosphorus and potassium to support growth of a grass cover. The nutrient requirements for the grass will be adequate to support biological activity in the soil column. Fertilizers and/or soil amendments will be added to the landfarm based upon recommendation of the soil agricultural laboratory.

2. All operations to minimize run-off of hazardous constituents will continue.

3. The run-on control system (dikes) will be maintained.

4. The run-off management system (dikes) will be maintained.

TABLE 3-2

Modified Skinner List

Constituents	Method (SW-846)	Reporting Limits (ug/g) (a)
Metals		
Antimony	7040	10.0
Arsenic	7061	1.0
Barium	7080	5.0
Beryllium	7090	.25
Cadium	7130	.25
Chromium	7190	2.50
Cobalt	7200	2.50
Copper	7210	1.00
Lead	7420	5.00
Mercury	7471	.25
Nickel	7540	5.00
Selenium	7740	1.0
Silver	7760	.50
Thallium	7840	5.00
Vanadium	7910	10.00
Zinc	7950	.25
Volatiles		
Benzene	8240	1.0
Carbon disulfide	8240	12.5
Chlorobenzene	8240	1.0
Chloroform	8240	1.0
1,2-Dichloroethane	8240	1.0
1,4-Dioxane	8240	1.0
Ethylbenzene	8240	1.0
Methyl ethyl ketone	8240	1.0
Styrene	8240	1.0
m-Xylene	8240	1.0
o-Xylene	8240	1.0
p-Xylene	8240	1.0
Semivolatiles Base/Neutrals Extractable Compounds		
Anthracene		5.0
Benzo(a)anthracene		5.0
Benzo(b)fluoranthene		5.0
Benzo(k)fluoranthene		5.0
Benzo(j)fluoranthene		5.0
Benzo(a)pyrene		5.0
Bis(2-ethylhexyl)phthalate		5.0
Butyl benzene phthalate		5.0
Chrysene		5.0

TABLE 3-2 (Cont'd)

Modified Skinner List

Constituents	Method (SW-846)	Limits (ug/g) (a)
Semivolatiles Base/Neutrals Extractable Compounds		
Dibenz(a,h)acridine		5.0
Dibenz(a,j)anthracene		5.0
o-Dichlorobenzenes		5.0
m-Dichlorobenzenes		5.0
p-Dichlorobenzenes		5.0
Diethyl phthalate		5.0
7-12-dimethyl benze(a)anthracene		5.0
Di-methyl phthalate		5.0
agr2		5.0
Fluoranthene		5.0
Indene		5.0
Methyl chrysene		5.0
1-Methyl naphthalene		5.0
Naphthalene		5.0
Phenanthrene		5.0
Pyrene		5.0
Pyridine		5.0
Quinoline		5.0
Acid Extractables		
Benzenethiol		5.0
2-Methylphenol		5.0
3-Methylphenol		5.0
4-Methylphenol		5.0
2,4-Dimethylphenol		5.0
2,4-Dinitrophenol		25.0
4-Dinitrophenol		25.0
Phenol		5.0

NOTE:
(a) Practical Quantitation Limits for volatiles are for high level soils (wet weight basis); Limits for semivolatiles, are for medium level soils (wet weight basis)

5. Wind dispersal will be monitored during the monthly inspections. Wind dispersal is not anticipated based on past refinery experience. Tillage will be avoided during excessively dry or windy periods. Should wind dispersal be observed during tillage, tilling will be stopped immediately.

6. Ground water and unsaturated zone monitoring will continue as shown in Table 3-3 and will use the procedures as described in CENEX's revised Ground Water Sampling Plan and Analysis Plan Monitoring and the interim status Unsaturated Zone Monitoring Plan, except that soil-pore liquid monitoring will have been terminated as of the approval of this closure plan, since this will have been more than 90 days after the last application of waste. Figure 3-4 shows sampling locations and areas. In addition, it should be noted that these ground water monitoring requirements could be altered by the Ground Water Assessment Plan submitted to the Montana DHES on April 10, 1990.

7. Soil cores will be collected from six locations (Areas A through F) within the landfarm and analyzed for oil and grease on an annual basis during Phase I closure, as depicted in Table 3-3.

8. The metals criteria shown in Table 3-4 will not be exceeded in the zone of Incorporation in active treatment areas. If they are exceeded, a discussion will be held with Montana DHES.

3.2 Phase I Closure Criteria

Figure 3-5 presents a flow chart of the Phase I closure criteria. The Zone of Incorporation sampling will involve collecting eight random subsamples taken from each treatment area. A composite sample for each area will be made from the eight samples. In order to meet Phase I Closure criteria, non-detection shall be defined as values less than those listed as reporting levels in Table 3-2. Metals closure criteria will be based on Table 3-4 in the Closure Plan which gives the maximum allowable metal accumulations in the ZOI. Table 3-3 also lists the parameters and methods for soil core monitoring. If the concentration of Modified Skinner list organic constituents are non-detectable in the six composite Zone of Incorporation (ZOI) samples, and if the oil and grease sampling in the six sets of 6"-12", 30"-36", and 60"-66" intervals does not indicate continued migration of oil and grease (i.e., declining concentrations with depth), then Phase I is terminated and Phase II of the closure can begin. The sampling required for these criteria can occur at the end of the first year of Phase I, however, should CENEX so choose, it can occur earlier.

U574

TABLE 3-3

Phase I and II Closure
Ground Water and Unsaturated Zone Monitoring Requirements

Note: All locations cited are existing, normally used locations

Ground Water[a]

Upgradient Wells	(CEN-8&9)	pH, SC, TOC, TOX - 4 replicates, each well, semi-annually.
Downgradient Wells	(CEN-1A, 2, 10 and 3 or 11, depending on ground water flow direction)	Fe, Mn, Na, Cl, SO_4, and phenol - one analysis each well, once per year.
		Water Levels - All wells, each sample event.

Soil Core Samples

Timing	Sample	Analyses
Within 30 days of start of closure, and end of each year during Phase I	Six Landfarm ZOI Composites - 6 samples[b]	Soil TOC; Available N, P & K; pH, Oil and Grease
At end of each year of Phase I	Six Landfarm ZOI Composites - 6 samples[b]	Modified Skinner List (Table 3-2)
At end of each year of Phase I	1 randomly selected core location per treatment area maximum of 6. 3 depths: maximum of 6"-12", 30"-36", 60"-66" for a maximum of 18 samples[d].	Oil & Grease - Freon extraction and Gravimetric Analysis

ZOI Zone of Incorporation, first 0-8" of soil

[a] Would be modified if sampling indicated by the Ground Water Assessment Plan as needed.

[b] Eight random grab samples per area; six areas.

[c] Locations can be sampled using a hand auger, drilling rig, backhoe, or other equivalent.

[d] Use same core locations, each year.

TABLE 3-4

Maximum Allowable Metal Concentrations -
Zone of Incorporation

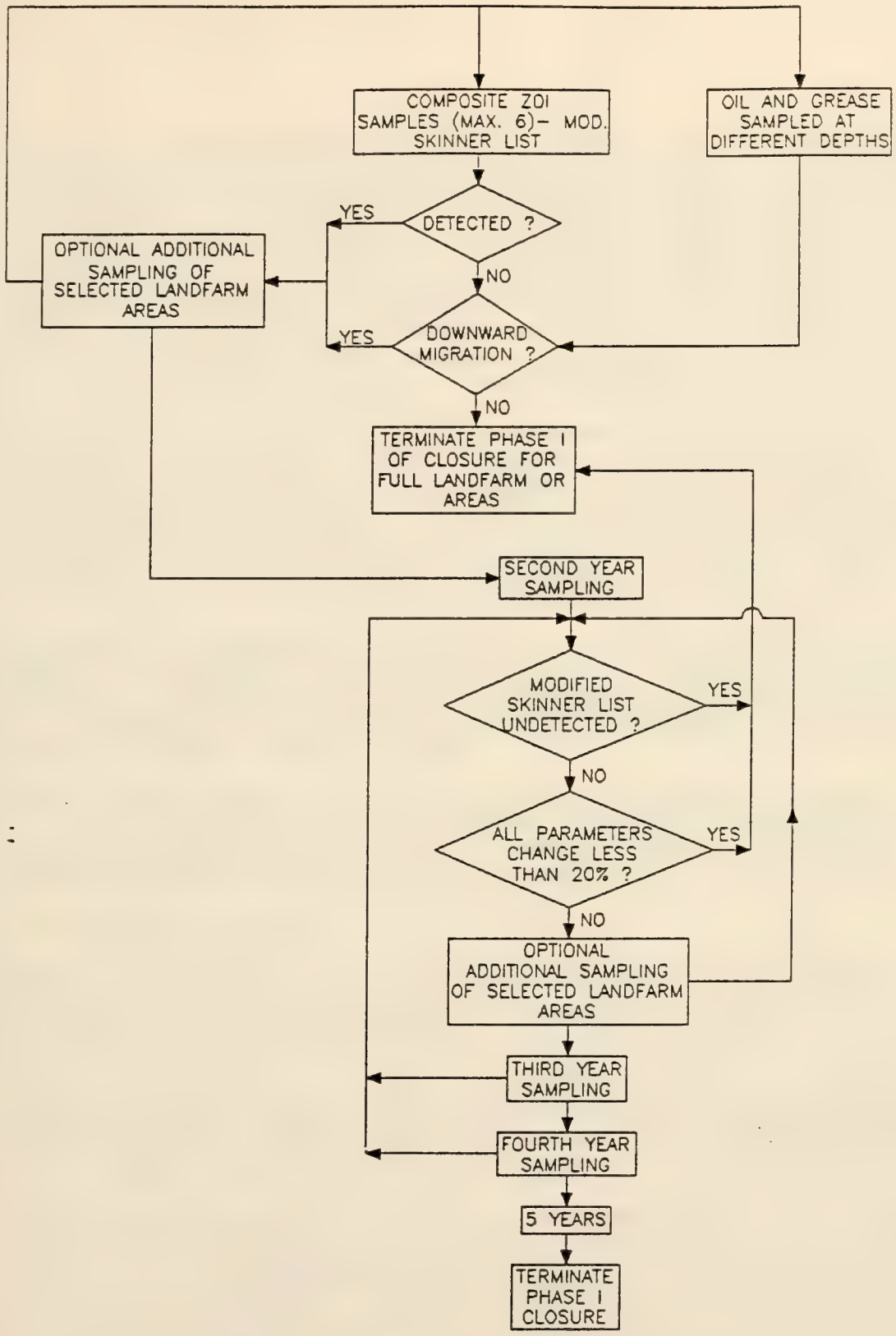
Parameter	Maximum Allowable Levels
Antimony	250 ppm[1]
Arsenic	300 ppm[2]
Barium	500 ppm[1]
Beryllium	50 ppm[2]
Cadmium	10 ppm[3]
Chromium	1000 ppm[2]
Cobalt	200 ppm[2]
Copper	250 ppm[2]
Lead	1000 ppm[2]
Mercury	10 ppm[1]
Nickel	100 ppm[2]
Selenium	20 ppm[4]
Vanadium	500 ppm[2]
Zinc	500 ppm[2]

[1] Values established from SW-874, Hazardous Waste Land Treatment, EPA, 1983, Table 6.52. The levels have been converted from Kg/ha-30 cm units to ppm, assuming a soil density of 1.35 g/cm^3.

[2] Values established from SW-874, Hazardous Waste Land Treatment, EPA, 1983, Table 6.47. The values are compiled from a literature review in SW-874, and are "based on microbial and plant toxicity limits, animal health considerations, and soil chemistry which reflects the ability of the soil to immobilize the metal elements" (p.272).

[3] Value established at upper limit of native soils range, SW-874.

[4] Value established at 2 x current detection limit.



ERM-Southwest, inc.
NEW ORLEANS, LOUISIANA HOUSTON, TEXAS

DATE 08/27/90 | W.O.NO. 3011A020H90

FIGURE 3–5
PHASE I CLOSURE CRITERIA
CENEX OLF Treatment Area
Laurel, Montana

R117

If any of the Modified Skinner list organic constituents are detected at the end of the first year of Phase I, in any of the composite Zone of Incorporation samples, then normal operating procedures as defined in Section 3.1 will continue. However, at CENEX's option, additional sampling could be performed to demonstrate that one or more, but not necessarily all of the treatment areas actually meet the criteria given in the paragraph above for cessation of Phase I. Such sampling would require three locations in each area to be sampled for ZOI and oil and grease interval samples. This could result in some areas passing into Phase II while others remained in Phase I.

If second year sampling shows non-detectable modified Skinner list organics in the ZOI, or if there is no change in parameter concentrations greater than ± 20% (including oil and grease) between the first and second years, then Phase II of the closure can proceed. At the end of the second year, CENEX can elect to demonstrate that an area(s) meet the ± 20% criteria for passing into Phase II utilizing a minimum of three locations in an area.

The annual sampling will continue as in the paragraph above until either the Phase I criteria are met, or a total of five years pass. However, CENEX could elect to discontinue the annual sampling (with the exception of 60"-66" oil and grease analyses) and simply continue Phase I through the fifth year.

Should Cenex choose the option of meeting Phase I Closure criteria by tilling for five years without sampling, the Montana DHES may, upon evaluation of the ground water assessment program, require sampling of the ZOI soils for the parameters listed in Table 3-2.

3.3 Phase II Closure

Phase II closure care will begin when the criteria stated in Section 3.2 are met for each treatment section. This could occur at different times or simultaneously for all areas.

The initial step of Phase II will consist of establishing a vegetative cover over the landfarm surface. The vegetative cover will consist of 30% western wheat grass, 30% farmway crested wheat grass, 30% sodar streambank grass, and 10% Fultz Alkali grass.

This grass cover will be seeded between March 15 and May 15, or August 15 and October 15 at a twenty (20) pounds per acre application rate. Prior to planting, the ground will be disked, harrowed and leveled by dragging. Since the proposed grasses require 12 inches of annual rainfall, irrigation is not needed as the grass will be grown as a dryland crop. The success of the grass will be judged by its ability to prevent wind dispersal of landfarm soils. Fertilizer will be added if necessary to sustain initial growth.

If weeds interfere with this, herbicides will be applied. The vegetative cover will not be grown for feed for animals whose products are consumed by humans, therefore it will not be a food-chain crop.
A 20' x 20' test plot with low oil and grease content will be seeded with the grass mixture noted above during the first spring of the Phase I period to demonstrate tolerance to landfarm conditions. The success of the vegetative cover will be judged by:

- Its ability to prevent wind dispersal of landfarm soils;
- Its ability to reproduce.

In the event that no grasses in the mixture are tolerant of the landfarm conditions, other native grasses will be tested. The objective of the plot will be to demonstrate that a grass cover can be maintained of sufficient quality to prevent significant soil erosion and wind dispersal.

Closure will be completed when Phase II ends for all treatment sections. Activities associated with Phase II closure are conservatively estimated to occur within 180 days, but could be longer, depending on the season in which Phase II begins.

4.1 General

The post-closure plan for the OLF area will cover a period of 30 years. During the post-closure period, requirements are in effect for preservation of integrity of the closure system, monitoring of the system, and maintenance. The post-closure plan must be amended as necessary to reflect current practices and requirements.

The post-closure care period will begin when Phase II of the closure plan has been completed, approximately 6 months to 2 years after the final waste placement.

The probable post-closure operator will be:

CENEX
P.O. Box 909
Laurel, Montana 59044
Tel: 406-628-4311

The name, phone number and address of the post-closure operator will be determined and entered in to the plan at the time of closure.

4.2 Inspection Schedule

In order to maintain the integrity of the vegetative cover, monitoring wells, run-on and run-off control measures, and security, the following items will be checked on a quarterly basis.

- check for erosion
- check for ponding of water
- check for vegetative cover
- check surface drainage ditches for debris and clogging
- check above-grade portion of monitoring wells for structural integrity
- check berms for signs of deterioration
- inspect fencing
- inspect benchmarks

The inspection log for the above activities is shown in Table 4-1. This log will also be used for recording maintenance activities performed based on these inspections.

4.3 Ground Water and Soil Core Monitoring

A ground water monitoring program is required as part of the measures to detect any release of hazardous waste to the environment. The ground water data to be obtained for the upgradient and downgradient wells at each sample event will be determined by the ground water

TABLE 4-1

Post Closure Inspection Report

CLOSURE: OLF Treatment Area

WEATHER CONDITIONS: _____

INSPECTION DATE: _____

TIME START: _____

INSPECTOR: _____

SUPERVISOR APPR: _____ DATE: _____

NO.	INSPECTION ITEM	CHECK LIST	PASS	FIX	REMEDIAL ACTION	DATE FIXED	PROCEDURE AND AMT. OF MAT'L. USED	REINSPECT. AND DATE
1	Visual Inspection	1a. Grass cover 1b. Ponded water 1c. Surface depressions			-Approved Topsoil Fill -Fertilize -Seed			
2	Excessive erosion	2a. Eroded soil 2b. Barren areas			-Approved Topsoil Fill -Fertilize -Seed			
3	Vegetative growth (March - November)	3a. Barren areas 3b. Miscolored leaves 3c. Excessive moisture in soil			3a. Revegetate 3b. Soil analysis Add fertilizer if necessary or adjust soil pH 3c. Improve drainage			
4	Drainage ditches	4a. Soil and debris build up			4a. Clean ditch			
5	Monitor wells	5a. Check above-ground structural integrity			5a. Repair above ground without replacing entire well 5b. If problem is below grade, replace entire well			

COMMENTS _____

TABLE 4-1

Post Closure Inspection Report

CLOSURE: OLF Treatment Area

WEATHER CONDITIONS: _____

INSPECTION DATE: _____

TIME START: _____

INSPECTOR: _____

SUPERVISOR APPR: _____ DATE: _____

NO.	INSPECTION ITEM	CHECK LIST	PASS	FIX	REMEDIAL ACTION	DATE FIXED	PROCEDURE AND AMT. OF MAT'L. USED	REINSPECT. AND DATE
6	Fencing	6a. Check for holes and deterioration in wire fabric			6a. Replace as needed			
7	Run-on and Run-off Berms	7a. Check for deterioration			7a. Replace and compact material as needed Fertilize and seed.			
8	Benchmarks	8a. Check for signs of disturbance			8a. Resurvey as needed.			

COMMENTS _____

assessment or a post-closure care Part B permit. Well locations can be seen in Figure 3-1. Post-closure monitoring will be performed according to the schedule determine by the ground water assessment program. During the post-closure care period, all monitoring data will be maintained on file at the refinery. All required statistical analyses (averaged replicate t-Test) will also be kept on file.

Reporting of ground water monitoring results to the State of Montana will be done via the annual generators report, in those years in which monitoring occurs.

Below treatment zones samples will be taken at six locations in the OLF and monitored during the post-closure period according to the schedule presented in Table 4-2. Details of all monitoring procedures can be found in CENEX's interim status Ground Water and Unsaturated Zone Monitoring Plans.

4.4 Maintenance

Planned preventative and corrective maintenance activities and maintenance schedule are listed in Tables 4-3 and 4-4.
Nonscheduled items that require maintenance will be identified on the inspection forms shown in Table 4-1. These forms will also serve as a record that maintenance items were implemented and the repair approved.
Ground water monitoring wells will be inspected during each sampling event. Any damage to locking caps, well casing, etc. will be corrected.

TABLE 4-3

Post-Closure Preventative Maintenance Activities

Activity	Purpose	Frequency
Fertilize cover grasses	Maintain healthy grass cover, prevent erosion, prevent pooling, (infiltration)	once
Visual inspection	Determine health of grass cover	1/mo.
Inspect fencing	Restrict access	1/mo.
Inspect and maintain run-on/run-off control berms	Prevent run-on and run-off	1/mo.
Inspect bench marks	Preserve relocatability of specific waste treatment areas	2/yr.
Inspect ground water wells	Insure well is locked and well casing is in good condition	2/yr.
Ground water monitoring	Determine if hazardous constituents have migrated into the uppermost aquifer	See Table 4-1
Soil core analyses	Monitor for waste constituents below the treatment zone.	See Table 4-2

TABLE 4-4

Post-Closure Corrective Maintenance Activities

Activity	Purpose	Frequency
Repair erosion damage with additional topsoil	prevent erosion, prevent pooling	As necessary
Reseeding and refertilization of eroded, bare areas	maintain integrity of grass cover	As necessary
Monitoring well replacement	maintain well integrity	Replace above-ground portion as necessary
Replace and compact material along berms	maintain run-on and run-off control	As necessary

5 - COST ESTIMATES

The Closure and Post-Closure cost estimates requirements will be addressed at a later data as requested by Montana DHES in their NOD letter of February 28, 1990.

6 - PERSONNEL TRAINING

6.1 Introduction

This plan documents the training required of personnel responsible for operation, inspection, monitoring, and maintenance of the hazardous waste landfarm facility throughout the closure and post-closure periods.

Classroom instruction and on-the-job training directed by the hazardous waste manager at CENEX's Laurel, Montana refinery is required of personnel closing the landfarm. This program is designed to enable them to operate these facilities properly and respond effectively to emergencies.

The training course defined in this plan is given to new operators (transferred or new employees) and is also reviewed annually (refresher course) with all personnel involved in the operation of the landfarm facility. This annual review also allows for the review of any changes to the various RCRA plans of which the operators should be aware. Records kept by the hazardous waste manager until closure of the hazardous waste facilities, as required by regulation, include job titles, qualifications and responsibilities, training programs and continuing hazardous waste education.

6.2 Training Course Outline

The following is an outline of the subjects covered by the hazardous waste training program at CENEX's Laurel, Montana refinery:

- RCRA Overview
- Hazardous Waste-General
- Hazardous Waste Applied to Landfarm
- Landfarm Operations and Training
- Post-Closure Inspection and Maintenance
- Contingency Plan.

This training will be in addition to other regular health and safety training that is provided at the Cenex facility.

6.3 Training Frequency

Facility personnel must successfully complete the training program within six months of assignment to the jobs related to the landfarm closure. Employees do not work in unsupervised positions until they have completed the training requirements. Facility personnel take part in an annual training review.

6.4 Training Records

Training records are kept on file at the refinery in the office of the Support Systems Engineer. These records are maintained until closure for current personnel and for three years from the date a former employee (whether transferred or terminated) last worked at the landfarm facility.

6.5 Summary

The Training Program outlined above is the means by which comprehensive, up-to-date information concerning all of the landfarm operations are conveyed to all personnel working in these areas. This allows for the proper operation of the facilities and the minimization of the effect of emergency situations. The program is designed to ensure that facility personnel are able to respond effectively to emergencies by familiarizing them with emergency procedures, emergency equipment, and emergency systems.

ATTACHMENT III.3a

CENEX • Post Office Box 909 • Laurel, Montana • 59044-0909 • Phone (406) 252-9326

February 13, 1991

Ms. Rosemary Rowe
RCRA Facilities Coordinator
State of Montana
Department of Health and Environmental Sciences
Solid and Hazardous Waste Bureau
Cogswell Building
Helena, MT 59620

Subject: Response to 12/31/90 Letter, "Comments on CENEX's Response to Closure/Post-Closure NOD"

Dear Ms. Rowe:

We greatly appreciated your comments and guidance during our meeting with you, Roger Thorvilson, Mark Hall and Stephanie Wallace (EPA) in Montana DHES's Helena Offices. Based on our discussions during that meeting we are providing our response to your December 31, 1990 comments letter, a copy of which is attached. We have keyed our following responses to the numbering system used in your letter.

C. Waste Characterization

All additional waste analyses that were not included in the original Part B application were provided in the NOD response date September 7, 1990.

D. Land Treatment Information

The old landfarm unit started receiving waste in 1964.

D-2. Unsaturated Zone Monitoring

(1) Sampling Location

The sampling locations were scattered about the old and new landfarm. The lysimeters and soil sampler were taken in approximately the same location to allow some sort of spatial comparison of the data collected.

RECEIVED
FEB 15 1991
MONTANA DEPARTMENT OF HEAL
AND ENVIRONMENTAL SCIENCE
SOLID & HAZARDOUS WASTE BUR

(2) Sampling Schedule

The list of parameters in Table 6-2 are the ones proposed (and not yet implemented) under final Part B status. The parameters listed in Table A-2 are the actual ones analyzed under Interim Status. Table 6-2 and Table A-2 are found in the September 7, 1990 NOD response.

(3) Soil Sampling

The depth intervals for soil sampling given in Table 6-1 of the September 7, 1990 NOD response were proposed for final Part B Status. The depth of sampling under Interim Status was to a three foot depth and these samples were taken by using a hand auger or by using a pick and shovel to excavate a test pit.

The sampling perform during the Phase I closure of the landfarm requires using a hollow stem auger drill rig and a split spoon sampler for obtaining soil samples from the required depth intervals. The split spoon sampler will be cleaned with alconox and water, followed by a distilled water rinse after each sample attempt.

In some instances, a backhoe may be used for obtaining soil samples for analysis by excavating a test pit. The upper one foot of soil will be scraped off the test area and stockpiled. Then each two foot increment will be removed and placed in a separate stockpile until the desired sampling depth is reached. When the sampling is complete, the soil piles will be replaced into the test pit in the reverse order they were removed with the upper oil being placed back on top. The backhoe bucket will be steam cleaned between test pits.

E. Ground Water

E-2. Ground Water Monitoring

It was proposed to relocate CEN-9 further to the west. This would take it away from a position immediately downgradient of known SWMU's which are North of the new landfarm's eastern half.

During the drilling of all new proposed wells, CENEX will visually monitor drill cuttings and soil samples for evidence of waste. In addition, soil samples will be sealed in plastic bags for several minutes and "sniffed" with an OVM meter. These two actions will ensure that the well is not placed through waste or waste mixed with soil.

E-5. Ground Water Monitoring

The following example indicates how ground water elevations will be corrected for the presence of a hydrocarbon layer in the well. Note that all numbers are for example purposes only.

EXAMPLE CALCULATION

Data

Top of Casing Elevation = 100.00'

Depth to Top of oil from top of casing = 10.42'

Depth to Top of Water from top of casing = 10.08'

Calculation

Oil Layer Thickness = 10.42' - 10.08' = 0.34'

Oil specific gravity = 0.965

Equivalent Water Thickness = 0.34' x 0.965 = 0.33

Depth to Top of Water = 0.33' + 10.08' = 10.41'

Equivalent Water Elevation = 100.00' - 10.41' = 89.59'

E-6.

The results of the seismic refraction study will be available to Montana DHES on March 1, 1991.

E-7.

It is not practical to sample the aquifer material for porosity due to the presence of large cobbles and gravel. Porosity can be estimated for this material from literature values.

The aquifer pump test has already been completed, after DHES's approval of Phase I of the ground water assessment. This approval was given in a letter from DHES dated May 18, 1990. The results of this test will be available March 1, 1991.

E-18.

No response required until a permit is drafted. However, CENEX believes the required monitoring parameters should be defined at the end of the ground water assessment, based on assessment data.

F-1. Closure Plan

The 1% oil and grease cutoff refers to any material taken out of the pits, whether it is waste or affected soils. The 1% cutoff is based upon our consultant's experience. It is believed that in a landfarm environment, when the soil/waste mixture has been degraded to this level, that little or no specific organics can be detected and that the remaining organics are immobile.

Once the one percent oil and grease limit is reached in the soil, a more comprehensive organic analysis will be done to confirm the affected soil removal. The analyses will be for parameters detected during the first Phase I closure sampling done in November 1989 and these are listed below:

- 1,2-Dichloroethane
- Chrysene
- Methylchrysene
- Pyrene

This analysis will be run on a sample composited from eight points located randomly across the bottom of the excavation. If the excavation is larger than the subareas (A through F), then one analysis will be done per subarea. Once the affected soil is being treated on the surface, then the criteria in the closure plan will be followed.

Action levels for each of the 4 constituents will be established either from Subpart S, or by a study of allowable quantities in groundwater based on the assumption of a nearby drinking well. We expect to have this study completd for your review by about Fefruary 22.

CENEX proposes to use 1000 mg/kg of total Pb as a cleanup goal for material excavated form the lead weathering area. This is the same limit as approved by DHES for the new landfarm closure plan. All affected soil above 1000 mg/kg will be disposed of in a appropriate manner.

It is CENEX's intention to utilize as much of the biodegradation capacity of the landfarm as possible to expedite bioremediation of deeper affected soils. The plan was written on the worst case assumption that the entire landfarm was underlain by an average of five feet of affected soil, which could only be spread in a one foot thick lift for bioremediation on top of the landfarm; hence the use of six areas in the landfarm (one being remediated, five to accomplish the remediation). However, it should be noted that when the first area is explored, if it doesn't produce enough affected soil to cover the rest of the landfarm with a one foot thick lift, another area will be immediately investigated, and affected soils spread until the entire area of the landfarm is being used for bioremediation or is being bioremediated. When the bioremediation is complete, the material will be placed backin the excavated areas, and the sequence repeated until the underlying affected soils for the entire landfarm are bioremediated. Thus, because of the one foot thick bioremediation lift thickness limitation, the same amount of material will be remediated on the same amount of time, regardless of whether reconnaissance is done area by area, or all at once. CENEX proposed to do reconnaissance area by area.

Based on six (B-4,5,7,8,9,12) randomly located borings in the old landfarm (See 9/7/90 closure and post closure plan - OLF Area), the expected average thickness of affected soils (>1% and grease) below a three foot depth and above the water table is approximately one foot, versus the five foot closure plan worst case assumption. Thus, the actual closure time should be less than the worst case 5-10 year estimate given to Montana DHES on 12/31/90.

F-3. Closure Cost Estimate

No response currently required.

If you have any further questions, feel free to call me at (406) 628-4311.

Sincerely,

CENEX Refinery

Bernie Gieser

Bernie Gieser
Environmental, Health & Saftey Director

BG/sms:X739
Attachments

ATTACHMENT
Montana DHES Letter of December 31, 1990

cc REP, LJD
Marty Briggs, ERM Southwest
Brian Flynn, ERM Southwest

Attachment III.4

U183

TABLE 2-2a

Summary of Waste Landfarmed
At Cenex Refinery

Waste Type	Units	Water	Oil & Grease	Solids	Total Quantity	Frequency of Generation
1. API/DAF Sludge Mix	Tons/yr	799	129	72	1,000	weekly
2. Wastewater Treatment Sludges	Tons/yr	28	4.5	2.5	35	yearly
3. Leaded Tank Bottoms	Tons/yr	0.2	0.3	2.7	3.2	every 5 yrs.
4. River Silt	Tons/yr	79.2	0	8.8	88	twice per yr.
5. Cooling Tower Sludge	Tons/yr	55.5	0	6	61.5	every 2 yrs.
6. Crude Tank Bottoms	Tons/yr	0	75.6	8.4	84	every 5-10 yrs.
7. Intermediate Tank Bottoms	Tons/yr	0	4.8	0.5	5.3	every 5-10 yrs.
8. Product Tank Bottoms	Tons/yr	0	4.8	0.5	5.3	every 5-10 yrs.
9. Biological Treatment Pond Sludge	Tons/yr	463.5	0	9.5	473	every 10 yrs.
10. Oil Contaminated Soil and Gravel	Tons/yr	27	1.4	106.6	135	quarterly
11. Process Vessel Wastes	Tons/yr	0	6.7	6.8	13.5	every 2 yrs.
12. Monitor Well Water	Tons/yr	4.2	0	0	4.2	twice per yr
TOTAL	Tons/yr	1456.6	227.1	224.3	1,908	

Attach. III .5

U815

TABLE 2-2b

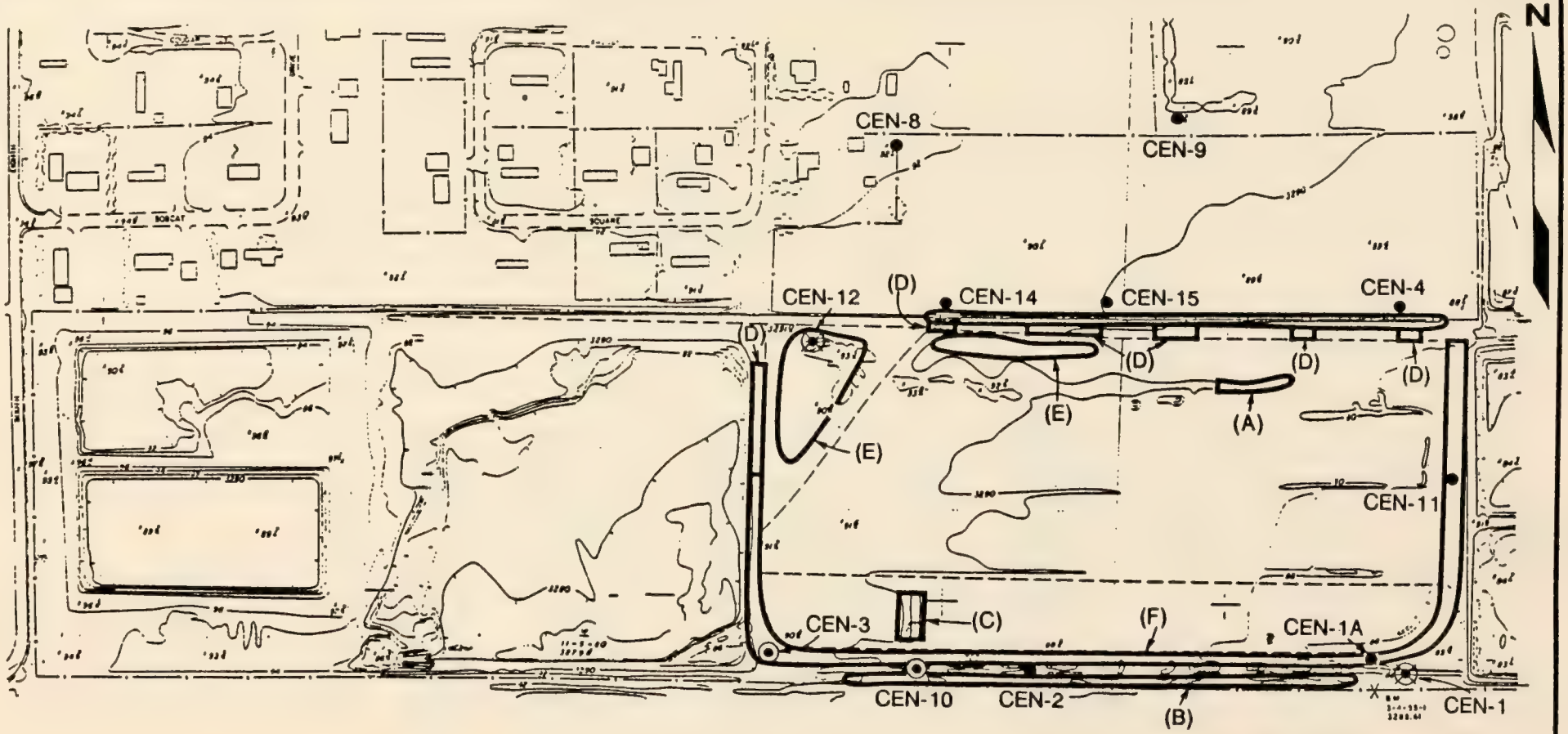
Annual Waste Landfarm Loading
Cenex Refinery
Laurel, Montana

	Waste Type	1988	1987	1986	1985	1984	1983	1982	1981
1	API/DAF Sludge Mix	820T	978T	492T	941T	1003T	1290T	1684T	2323T
2.	Wastewater Treatment Sludges	91T	66T	---	27T	---	---	---	---
3	Leaded Tank Bottoms	---	---	---	---	---	---	---	7.5T (OLF TEL AREA)
4	River Silt	23T (OLF)	---	34T (OLF)	222T (OLF)	---	---	---	---
5	Crude Tank Bottoms	2T	1T	---	---	---	---	---	---
6	Intermediate Tank Bottoms	---	---	---	---	---	---	---	---
7	Oil Contaminated Soil and Gravel	2160 (OLF)	---	---	---	---	---	---	---
8.	Process Vessel Wastes	29T	---	---	---	---	---	---	---

NOTE:

The non-hazardous waste amounts from 1981 to 1984 are not known due to lack of records.

T = Ton
OLF = Old Landfarm Disposal
TEL = Tetra Ethyl Lead



SITES	DESCRIPTION
A	ASPHALTIC MATERIAL, PARTIALLY CAPPED WITH DIRT PRIOR TO JULY, 1970
B	ASPHALTIC MATERIAL, MISC. PLANT SLUDGES (API SLUDGE, CAF SLUDGE, HOT PROCESS SOFTENER SLUDGE), INACTIVE SINCE MID 1970'S.
C	ASPHALTIC MATERIAL, MISC. PLANT SLUDGES (API, CAF, HOT PROCESS SOFTENER LIME), CAPPED WITH DIRT IN 1982.
D	SCRAP METAL (6 TRENCHES) UNDER GRAVEL ROAD, CAPPED IN 1984.
E	SCRAP METAL, BRICKS, CONCRETE, GENERAL PLANT SCRAP STORED ON GROUND SURFACE, SCRAP REMOVED IN 1984.
F	ALUMINA AND DRYER SLEVES PLACE ON ROAD.

ERM-Southwest, inc.
NEW ORLEANS, LOUISIANA HOUSTON, TEXAS

DATE 8/[illegible]/90 W.O.NO. 3011A07

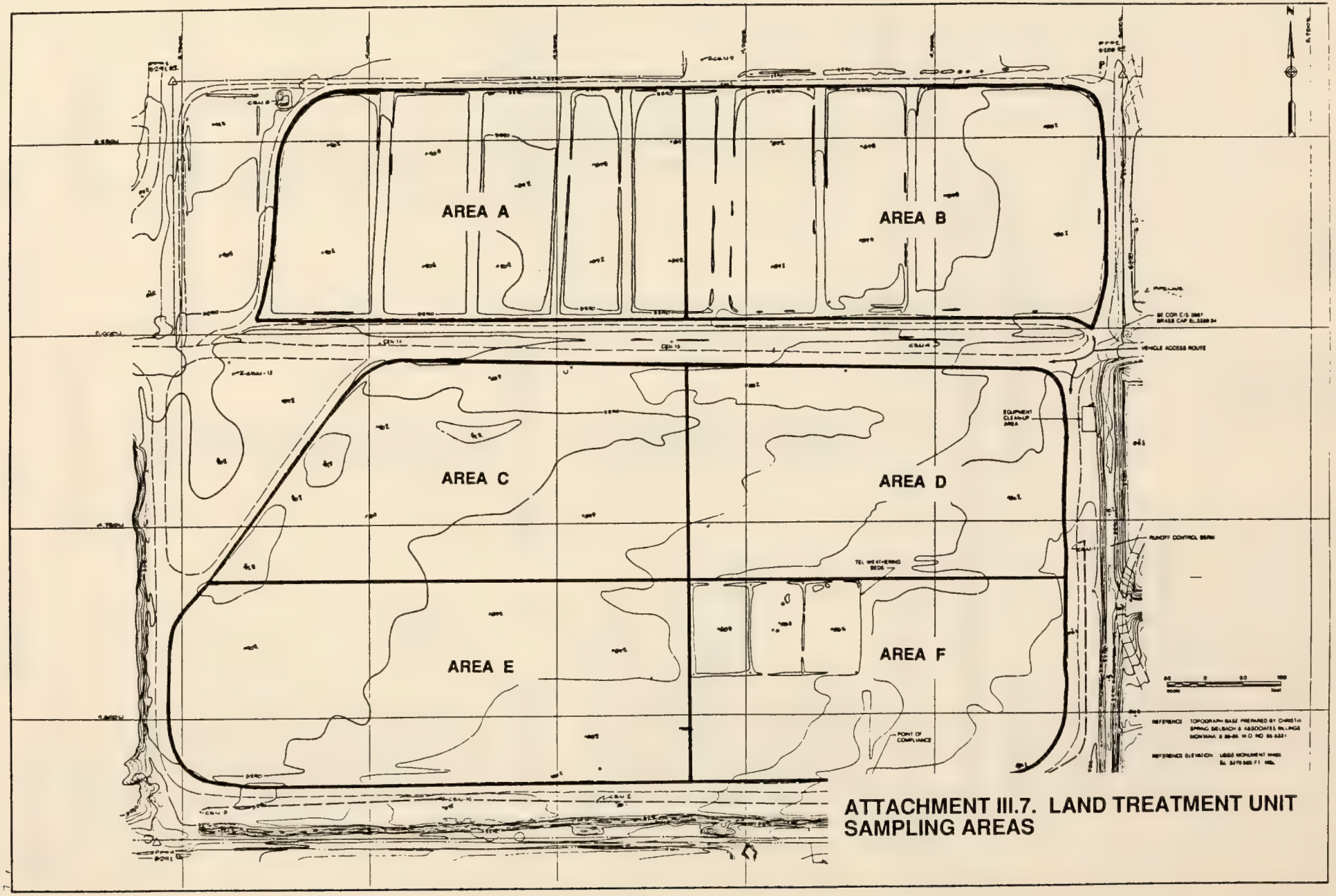
FIGURE 2-1
SOLID WASTE MANAGEMENT UNIT
LOCATIONS IN THE OLF
Cenex Refinery
Laurel, Montana

U186

TABLE 2-3

Hazardous and Nonhazardous Waste Disposal
at the OLF

Site Designation	Year Opened	Waste and Disposition	Year Closed or Waste Disposal Discontinued
A	1968	Asphaltic material put into trenches partially capped with dirt	1970
B	1972	Asphaltic material and miscellaneous plant sludges (API sludge, CaF sludge, hot process softener lime sludge)	1975
C	1975	Two trenches filled with asphaltic material and miscellaneous plant sludges (API, CaF, hot process softener lime), capped with dirt	1982
D	1984	Scrap metal placed in six trenches under a gravel road, capped with dirt	1984
E	1964	Scrap metal, bricks, concrete, general plant scrap stored on ground surface Scrape removed, area cleaned	1984
F	1967	Aluminum and dryer sieves placed on the road	In use?



ATTACHMENT III.7. LAND TREATMENT UNIT SAMPLING AREAS

Parameters, Methods, and Reporting Limits for Soil Monitoring

1. Metals	Method (SW-846)	Reporting Limits(µg/g)
Antimony	7040	10.0
Arsenic	7061	.10
Barium	7080	5.0
Beryllium	7090	.25
Cadium	7130	.25
Chromium	7190	2.50
Cobalt	7200	2.50
Copper	7210	1.00
Lead	7420	5.00
Mercury	7471	.010
Nickel	7520	5.00
Selenium	7740	.10
Silver	7760	.50
Thallium	7840	5.00
Vanadium	7910	10.00
Zinc	7950	.25

2. Volatiles	Method (SW-846)	Reporting Limit(µg/g)*
Benzene	8240	1.0
Carbon disulfide	8240	12.5
Chlorobenzene	8240	1.0
Chloroform	8240	1.0
1,2-Dichloroethane	8240	1.0
1,4-Dioxane	8240	1.0
Ethylbenzene	8240	1.0
Methyl ethyl ketone	8240	1.0
Styrene	8240	1.0
Toluene	8240	1.0
m-Xylene	8240	1.0
o-Xylene	8240	1.0
p-Xylene	8240	1.0

*Practical Quantitation Limits for high level soils (wet weight basis)

3. Semi-Volatile Base/Neutral Extractablle Compounds

Compound	Reporting Limit (µg/g)* SW-846/8270
Anthracene	5.0
Benzo(a)anthracene	5.0
Benzo(b)fluoranthene	5.0
Benzo(k)fluoranthene	5.0
Benzo(j)fluoranthene	5.0
Benzo(a)pyrene	5.0

Attachment 3 continued.

Bis(2-ethylhexyl)phthalate	5.0
Butyl benzyl phthalate	5.0
Chrysene	5.0
Dibenz(a,h)acridine	5.0
Dibenz (a,h)anthracene	5.0
o-dichlorobenzenes	5.0
m-Dichlorobenzene	5.0
p-Dichlorobenzene	5.0
Dimethylphthalate	5.0
7,12-Dimethylbenz(a)anthracene	5.0
Dimethylphthalate	5.0
Di(n)butyl phthalate	5.0
Fluoranthene	5.0
Indene	5.0
Methyl chrysene	5.0
1-Methyl naphthalene	5.0
Naphthalene	5.0
Phenanthrene	5.0
Pyrene	5.0
Pyridine	5.0
Quinoline	5.0

Acid Extractables

Benzenethiol	5.0
2-methylphenol	5.0
3-methylphenol	5.0
4-methylphenol	5.0
2,4-Dimethylphenol	5.0
2,4-Dinitrophenol	25..0
4-Dinitrophenol	25.0
Phenol	5.0

*Practical Quantitation Limits for medium-livel soils (wet weight)

TABLE 3-4

Maximum Allowable Metal Concentrations -
Zone of Incorporation

Parameter	Maximum Allowable Levels
Antimony	250 ppm[1]
Arsenic	300 ppm[2]
Barium	500 ppm[1]
Beryllium	50 ppm[2]
Cadmium	10 ppm[3]
Chromium	1000 ppm[2]
Cobalt	200 ppm[2]
Copper	250 ppm[2]
Lead	1000 ppm[2]
Mercury	10 ppm[1]
Nickel	100 ppm[2]
Selenium	20 ppm[4]
Vanadium	500 ppm[2]
Zinc	500 ppm[2]

[1] Values established from SW-874, Hazardous Waste Land Treatment, EPA, 1983, Table 6.52. The levels have been converted from Kg/ha-30 cm units to ppm, assuming a soil density of 1.35 g/cm^3.

[2] Values established from SW-874, Hazardous Waste Land Treatment, EPA, 1983, Table 6.47. The values are compiled from a literature review in SW-874, and are "based on microbial and plant toxicity limits, animal health considerations, and soil chemistry which reflects the ability of the soil to immobilize the metal elements" (p.272).

[3] Value established at upper limit of native soils range, SW-874.

[4] Value established at 2 x current detection limit.

MODULE IV - POST-CLOSURE CARE OF THE LAND TREATMENT UNIT

IV.A. APPLICABILITY

The requirements of this Permit Module apply to the post-closure maintenance and monitoring of the land treatment unit identified in Condition II.A. at the Cenex refinery during the post-closure period. The post-closure period is thirty years after certification of closure unless modified under Condition IV.F.1.b. The Permittee must maintain and monitor the land treatment unit in accordance with this Permit, applicable requirements in Title 16, Chapter 44, ARM, and as specified in the Application and addenda to the Application and the Post-Closure plans.

IV.B. POST-CLOSURE PERIOD CARE STANDARD

The Permittee shall monitor the land treatment unit throughout the post-closure care period in a manner that will ensure detection of a release of hazardous waste, hazardous waste constituents, leachate, contaminated runoff or waste decomposition products to the groundwater or surface water from the closed unit. The Permittee shall maintain all monitoring equipment throughout the post-closure care period in a manner that will ensure detection of a release from the closed unit.

IV.C. POST-CLOSURE PLAN

IV.C.1. Written Plan

IV.C.1.a. The Permittee must comply with the Post-Closure plan described in Attachments III.2. and III.3. of this Permit.

IV.C.1.b. Personnel listed in Attachment IV.1. shall be the contact(s) concerning the hazardous waste disposal unit or facility during the closure/post-closure care period.

IV.C.2. Until final facility closure, a copy of the approved post-closure plan shall be furnished to the Department upon request, including request by mail. After final closure has been certified, the office specified in Condition IV.C.1.b. shall keep the approved post-closure plan during the remainder of the post-closure period.

IV.D. AMENDMENT OF PLAN

The Permittee may request a permit modification in compliance with ARM 16.44.116 to authorize a change in the approved post-closure plan in accordance with the applicable requirements of Title 16, Chapter 44, Subchapters 1 and 9. The written request shall include a copy of the amended post-closure plan for

approval by the Department.

IV.D.1. The Permittee may submit a written request to the Department for a permit modification to amend the post-closure plan at any time during the active life of the facility or during the post-closure care period.

IV.D.2. The Permittee shall submit a written request for a permit modification to authorize a change in the approved post-closure plan whenever:

IV.D.2.a. Changes in operating plans or facility design affect the approved post-closure plan; or

IV.D.2.b. Events which occur during the active live of the facility, including partial and final closures, affect the approved post-closure plan.

IV.D.3. The Permittee shall submit a written request for a permit modification at least 60 days prior to the proposed change in facility design or operation, or no later than 60 days after an unexpected event has occurred which has affected the post-closure plan.

IV.D.4. The Department may request modifications to the plan under Condition IV.D.2. and 3. of this Module. The Permittee shall submit the modified plan no later than 90 days after the Department's request. Any modifications requested by the Department will be approved, disapproved, or modified in accordance with the procedures in Title 16, Chapter 44, ARM.

IV.E. POST-CLOSURE OPERATION OF THE LAND TREATMENT UNIT

During the post-closure period, the Permittee must:

IV.E.1. Continue all operations specified in this Permit necessary to maximize degradation, transformation, or immobilization of hazardous constituents within the treatment zone, including nutrient and pH control, except to the extent they are inconsistent with Condition IV.E.2.

IV.E.2. Maintain the vegetative cover over closed portions of the facility.

IV.E.3. Continue all operations in the treatment zone to minimize run-off of hazardous constituents, including maintenance of the runoff management structures required under the terms of the Permit.

IV.E.4. Control wind dispersal of hazardous waste as required.

IV.E.5. Continue to comply with prohibitions and conditions concerning growth of food chain crops.

IV.E.6. Continue BTZ monitoring in compliance with Condition III.M.6. of this Module, but with decreasing frequency, during the post-closure period:

IV.E.6.a. One-half year after vegetation is established;

IV.E.6.b. One year after vegetation is established;

IV.E.6.c. Two years after vegetation is established;

IV.E.6.d. Four years after vegetation is established;

IV.E.6.e. Eight years after vegetation is established;

IV.E.6.f. Sixteen years after vegetation is established; and

IV.E.6.g. Thirty years after vegetation is established;

During the post-closure period, the Department may decide that more frequent below treatment zone soil monitoring is necessary, at which time the Department will notify the Permittee in writing. Examples of conditions that could warrant more frequent BTZ sampling would be, but are not limited to, the appearance of hazardous constituents in groundwater immediately downgradient of the land treatment units or inadvertent damage to the vegetative cover.

IV.E.7. Continue groundwater monitoring in accordance with Module V.

IV.E.8. The Permittee shall no longer be subject to Conditions IV.E.1.-IV.E.7. at such time as the Permittee can demonstrate to the Department that the level of hazardous constituents, including metals, in the treatment zone soil does not exceed the background value of those constituents by an amount that is statistically significant when using a test as specified in 40 CFR 264.280(d)(3).

IV.E.9. The post-closure care period shall extend for 30 years, unless the post-closure plan is amended through a permit modification, as specified in 40 CFR 264.118(d).

IV.F. POST-CLOSURE CARE AND USE OF PROPERTY

IV.F.1.a. Post-closure care shall begin after completion of closure of the unit and continue for 30 years after that date and shall consist of the monitoring and reporting requirements specified in Permit Modules III, IV and V.

IV.F.1.b. Any time preceding closure of the land treatment unit or any time during the post-closure period, the Department may, in accordance with the permit modification procedures in Title 16, Chapter 44, Subchapters 1 and 9, ARM:

IV.F.1.b.i. Shorten the post-closure care period applicable to the hazardous waste management unit if the Department finds that the reduced period is sufficient to protect human health and the environment (e.g., soils or

groundwater results, characteristics of the hazardous wastes, application of advanced technology, or alternative disposal, treatment, or re-use techniques indicate that the hazardous waste management unit is secure); or

IV.F.1.b.ii. Extend the post-closure care period applicable to the hazardous waste management unit if the Department finds that the extended period is necessary to protect human health and the environment (e.g. if the compliance groundwater monitoring period extends into the post-closure care period).

IV.F.2. The Department shall require, at closure, continuation of the security requirements of Permit Condition II.D. during the post-closure period when:

IV.F.2.a. Hazardous wastes may remain exposed after completion of final closure; or

IV.F.2.b. Access by the public or domestic livestock may pose a hazard to human health.

IV.F.3. Post-closure use of property on or in which hazardous wastes remain after closure shall never be allowed to disturb the integrity of the final cover or any other components of the containment system, or the function of the unit's monitoring systems, unless the Department finds that the disturbance:

IV.F.3.a. Is necessary to the proposed use of the property and will not increase the potential hazard to human health or the environment; or

IV.F.3.b. Is necessary to reduce a threat to human health or the environment.

IV.F.4. All post-closure care monitoring activities shall be in accordance with the provisions of the approved post-closure plan as specified in Attachments III.2. and III.3. and Permit Conditions III.M.

IV.F.5. Following each BTZ sampling event required under Condition IV.E.6., the Permittee shall submit to the Department, laboratory reports for the BTZ samples. The evaluation and notification procedures of III.N.2. shall be followed.

IV.F.6. The Permittee shall keep records of:

IV.F.6.a. All inspections;

IV.F.6.b. All activities taken to maintain the vegetative cover.

IV.F.6.c. Monitoring records including sampling logs or notes, analytical results, evaluations and required reports;

IV.F.6.d. A copy of the valid permit;

IV.F.6.e. Copies of requests for permit modifications or changes in practices and procedures.

IV.G. POST-CLOSURE NOTICES

IV.G.1. No later than 60 days after certification closure of the land treatment unit, the Permittee shall submit to the local zoning authority, or the authority with jurisdiction over local land use, and to the Department a record of the type, location, and quantity of hazardous wastes disposed of within each disposal unit of the facility. For hazardous wastes disposed of before January 12, 1981, the Permittee shall identify the type, location, and quantity of the hazardous wastes to the best of his/her knowledge and in accordance with any records that have been kept.

IV.G.2. Within 60 days of certification of closure of the land treatment unit, the Permittee must:

IV.G.2.a. Record a notation on the deed to the facility property that will in perpetuity notify any potential purchaser of the property that:

IV.G.2.a.i. The land has been used to manage hazardous wastes; and

IV.G.2.a.ii. Its use is restricted under Permit Module III and IV; and

IV.G.2.a.iii. The survey plat and record of the type, location, and quantity of hazardous wastes disposed of within the land treatment unit have been filed with the local zoning authority or the authority with jurisdiction over local land use and with the Department; and

IV.G.2.b. Submit a certification, signed by the Permittee, that he or she has recorded the notation specified in Permit Condition IV.G.2.a., including a copy of the document in which the notation has been placed, to the Department.

IV.G.3. If the Permittee or any subsequent Permittee of the land upon which a hazardous waste disposal unit is located wishes to remove hazardous wastes, hazardous waste residues, or contaminated soils, he or she shall request a modification to the post-closure permit in accordance with the applicable requirements in Title 16, Chapter 44, Subchapters 1 and 9, ARM. The Permittee shall demonstrate that the removal of hazardous wastes will satisfy the criteria of Condition F.3 of this Module. By removing hazardous waste, the Permittee may become a generator of hazardous waste and shall manage it in accordance with all applicable requirements of Title 16, Chapter 44, Subchapter 4. If the Permittee is granted a permit modification or otherwise granted approval to conduct such removal activities, the Permittee may request that the Department approve either:

IV.G.3.a. The removall of the notation on the deed to the facility property or other instrument normally examined during title search; or

IV.G.3.b. The addition of a notation to the deed or instrument indicating the removal of the hazardous waste.

IV.H. COST ESTIMATE FOR POST-CLOSURE CARE

IV.H.1. The Permittee must adjust the post-closure care cost estimate for inflation within 30 days after the close of the fiscal year for Cenex. This annual inflation adjustment shall:

IV.H.1.a. Be subject to the permit modification requirements of ARM 16.44.118;

IV.H.1.b. Be calculated using the procedure outlined in ARM 16.44.804.

IV.H.2. The Permittee must revise post-closure care cost estimate no later than 30 days after the Department has approved a request to modify the post-closure care plan. This condition is subject to the permit modification requirements of Permit Condition I.C.1. and ARM 16.44.116. The revised post-closure care cost estimate must be adjusted for inflation as specified in Permit Condition IV.H.1.

IV.H.3. The Permittee must keep at the facility the latest post-closure care cost estimate.

IV.I. FINANCIAL ASSURANCE FOR POST-CLOSURE

The Permittee shall demonstrate continuous compliance with ARM 16.44.815 by providing documentation of financial assurance, as required by ARM 16.44.823 in at least the amount of the cost estimates required by Permit Condition IV.H.1. Changes in the financial assurance mechanism must be approved by the Department.

MODULE IV - ATTACHMENTS

Attachment IV.1: Closure/Post-Closure Facility Contact

Attachment IV.1.

Closure/Post-Closure Facility Contact

Bernie Gieser

CENEX

P.O. Box 909

Laurel, MT 59044-0909

628-4311

MODULE V - GROUNDWATER MONITORING

V.A. APPLICABILITY

V.A.1. The requirements of this module shall pertain to the land treatment unit identified in Condition II.A.

V.A.2. Permit modification provisions under Permit Condition I.C. shall be followed in defining specific well placement and other requirements to be followed for groundwater monitoring.

V.A.3. The Permittee must follow all of the provisions under ARM 16.44.702 and the following rules regarding groundwater protection in the Montana Clean Water Act: ARM 16.20.601-643, ARM 16.20.701-705, and ARM 16.20.1001-1025 and as defined by these permit conditions.

V.A.4. For the purposes of this permit, the ARM 16.44.702 regulations and provisions for compliance monitoring shall be defined specifically for waste management compliance points and any additional compliance monitoring wells and corrective action assessment wells identified in this Permit under 40 CFR 264, Subpart F, except as determined by the Department.

V.A.5. The present regulated unit and compliance network to be constructed are shown in Attachment V.1. The following changes will be made to the compliance monitoring network following Permit issuance:

V.A.5.a. An additional upgradient well, CEN-25, will be installed. Upgradient well CEN-9 will be relocated to an area not influenced by past or present waste management activities.

V.A.5.b. Wells CEN-1A, CEN-2, CEN-3, CEN-10, and CEN-11 will be relocated to the locations shown as CEN-1B, CEN-2A, CEN-3A, and CEN-10A as shown in Attachment IV.1. These wells will be replaced as a part of the closure activities in the Old Land Farm Closure Plan as described in Attachment III.3. Wells will be abandoned in accordance with the procedures in Attachment V.6.

V.A.5.c. Within thirty days of the effective date of this Permit, the Permittee shall submit a plan for the installation of these well. This plan shall include:

V.A.5.c.i. Monitoring well design and construction;

V.A.5.c.ii. Precise locations of wells installations; and

V.A.5.c.iii. Schedule of installation with installation to be completed within 90 days of the effective date of the Permit.

Upon approval of the plan and the schedule by the Department, the Permittee shall proceed with installation of these wells.

V.A.5.d. Wells CEN-3A, CEN-10A, CEN-2A, CEN-1B, and CEN-11A are wells that define the points of compliance.

V.A.5.e. Wells CEN-4, CEN-12, CEN-14, and CEN-15 are assessment wells in the compliance monitoring network.

V.A.5.f. Wells CEN-8, CEN-25, and CEN-9 shall serve as upgradient or background wells. Any groundwater quality data submitted as background data shall be based on samples from a well that is:

V.A.5.f.i. Upgradient at all times from any hazardous waste management area;

V.A.5.f.ii. Not threatened by possible contamination;

V.A.5.f.iii. Can provide a representative sample of background water quality for the aquifer monitored by the existing network; and

V.A.5.f.iv. Is approved by the Department.

V.A.6. Regulated units subject to these provisions may be excluded based on the criteria set forth in 40 CFR 264.90(b). The regulations and conditions of this Permit for groundwater monitoring apply during the active life of the regulated unit including the closure period and as defined in 40 CFR 264 Subparts F, G, and M. during the compliance and post-closure periods.

V.B. REQUIRED PROGRAMS

V.B.1. The Permittee shall conduct a monitoring and response program as follows for the land treatment unit subject to these provisions:

V.B.1.a. The Permittee shall implement the compliance monitoring program as defined in this Module and 40 CFR 264.99.

V.B.1.b. Whenever the Groundwater Protection Standard under Condition V.C. of this Permit is exceeded at the point of compliance, the Permittee shall institute a corrective action program under 40 CFR 264.100. and Condition V.F. of this Permit. Because the Groundwater Protection Standard is currently exceeded, the Permittee shall institute a corrective action program in accordance with Permit Condition V.F.

V.B.1.c. Whenever hazardous constituents under 40 CFR 264.93 exceed concentration limits under Condition V.C. of this Permit in groundwater downgradient from the compliance point(s) defined in Permit Condition V.A.5., the Permittee shall institute a corrective action program under 40

CFR 264.100 and Condition IV.F. of this Permit. Because Waste Management Units are associated with the land treatment unit, down gradient and off-site releases will be addressed under Module VI of this Permit.

V.B.2. The Permittee shall follow all of the elements of these required programs as defined in this section of the Permit. The Department may include one or more of the programs in Condition V.B.1. above as may be necessary to protect human health and the environment and will specify the circumstances under which each of the programs may be required.

V.C. GROUNDWATER PROTECTION STANDARD

The Department shall establish groundwater protection standards for each hazardous constituent that has entered groundwater at the time evidence indicates that any hazardous constituents have entered groundwater beneath a regulated unit. The Department shall also determine at such time the hazardous constituents to which the protection standard applies as defined in 40 CFR 264.93, the concentration limits as defined in 40 CFR 264.94, the point(s) of compliance under Permit Condition V.A.5. and 40 CFR 264.95 and the compliance period under 40 CFR 264.96. At the time of permit issuance, the Department has determined that monitoring evidence indicates groundwater contamination and that maintenance of a compliance monitoring system is required. The Groundwater Protection Standard includes:

V.C.1. The hazardous constituents listed in Attachment V.2. and any additional hazardous constituents detected in the groundwater after this Permit is issued. The constituents in Attachment V.2 are those on the Modified Skinner List of hazardous constituents commonly found in refinery waste. Also included in Attachment V.2 are constituents found during groundwater sampling at the land treatment unit but not on the Skinner List.

V.C.2. Concentration limits are equal to the practical quantitation limit (PQL) for the applicable analytical method in SW-846, Test Methods for Evaluating Solid Waste: Physical/Chemical Methods, September, 1986, EPA except for those constituents listed in Table 1 of 40 CFR 264.94.

V.C.3. The compliance points as defined in Permit Condition V.A.5.d.

V.C.4. The compliance period as defined in Permit Condition V.E.3.

V.D. GENERAL MONITORING REQUIREMENTS

V.D.1. Definitions

V.D.1.a. Background values represent the quality of groundwater from a hydrogeologically equivalent source upgradient from the RCRA unit.

V.D.1.b. A concentration limit for a given compound is any measured concentration which equals or exceeds the practical quantitation limit for the applicable analytical method in SW-846. Attachment V.2. sets the applicable analytical method for each set of constituents in the Groundwater Protection Standards and the PQLs used to establish the concentration limit. Any compound whose concentration in groundwater equals or exceeds its PQL, as set in the applicable method of SW-846, is added to the list of constituents under the Groundwater Protection Standard. If in any sampling event, analysis shows a PQL higher than those in Attachment V.2, the concentration limit shall be considered to have been exceeded.

V.D.1.c. The method detection limit (MDL) is defined as the method-specific concentration at which there is a specific assurance of the presence and identity of a given parameter in a sample. The method detection limit is obtained by the analytical laboratory for each method following the procedures in SW-846. An estimated method detection limit in groundwater has been developed by EPA for specific parameters and methods in SW-846 based on nationwide laboratory experience.

V.D.1.d. Principal hazardous constituents (PHC) are found in significant quantities in the permitted wastes or have been detected in the groundwater.

V.D.1.e. The practical quantitation limit (PQL) is the lowest concentration of a parameter that can be reliably determined within specified limits of precision and accuracy by the indicated methods under routine laboratory operating conditions. PQLs are based on a general estimate for the method and are usually 10 times the estimated method detection limit. The methods in SW-846 list obtainable PQLs.

V.D.1.f. A reportable value is defined as any measured concentration for an analyte which equals or exceeds the method detection limit as determined by the analytical laboratory.

V.D.2. General

The Permittee shall comply with the following general requirements:

V.D.2.a. The groundwater monitoring system shall consist of a sufficient number of wells, installed at appropriate locations and depths to yield groundwater samples from the uppermost aquifer that represent the quality of background water that has not been affected by leakage from a regulated unit and represent the quality of groundwater passing the point of compliance.

V.D.2.b. All new monitoring wells shall be constructed in accordance with the provisions in 40 CFR 264.97(c) and Permit Condition V.D.3.

V.D.2.c. The groundwater monitoring programs shall include consistent sampling and analysis procedures defined in 40 CFR 264.97(d) and Permit Condition V.D.4.

V.D.2.d. The Permittee shall follow requirements for measurement of the groundwater surface elevation as specified in Permit Condition V.D.5.

V.D.2.e. The Permittee shall follow the procedures for statistical evaluation outlined in Permit Condition V.E.9. in determining whether critical concentration limits have been exceeded.

V.D.3. New Well Location and Construction

V.D.3.a. New well construction shall follow the techniques described in the Technical Enforcement Guidance Document (TEGD), OSWER-9950.1, September, 1986, unless the Permittee can demonstrate to the Department or the Department determines that an alternative technique is appropriate for protection of human health and the environment. All monitoring wells shall be cased in a manner that maintains the integrity of the monitoring well bore hole. Casing and screen shall be stainless steel unless the Permittee can demonstrate that an alternative material is appropriate for protection of human health and the environment. The casing shall be screened or perforated and packed with gravel or sand where necessary (i.e., the space between the bore hole and well casing) above the sampling depth and shall be sealed to prevent contamination of samples and the groundwater.

V.D.3.b. The Permittee shall develop and maintain new monitoring wells in accordance with TEGD guidance. The Permittee shall submit monitoring well completion reports which include boring logs, water level elevations, water contour maps including the latest surveyed wellhead reference elevations, well development results including recharge rates, cross sections or fence diagrams as well as all other pertinent data such as sieve analyses, standard penetration tests and any other analytical tests performed during well installation and development within 90 days after completion of wells installed after Permit issuance.

V.D.3.c. Additional saturated zone monitoring wells shall be installed to maintain compliance if subsurface conditions significantly change or if the Department's understanding of subsurface conditions significantly change after Permit issuance. Such changes may include but are not limited to, significant water level elevation changes, an apparent deviation from the current pattern of flow direction, or a change in the migration path of organic constituents. The Department may require the Permittee to install and sample additional wells at any time during the closure, post-closure or compliance periods of the land treatment unit if new information or unforseen circumstances reveal a need for additional monitoring to protect human health and the environment.

V.D.3.d. The monitoring wells in the compliance network shown in Attachment V.1. shall be maintained in a fully operating condition for the duration of this Permit. The Permittee shall notify the Department when a well is no longer properly functioning (including a marked change in pumping rate, presence of sandy or silty materials, and cracked or broken casings) or when the Permittee intends to close one or more wells associated with the land treatment unit. The Department shall specify the conditions for replacement or correction of improperly operating well(s). Unless otherwise specified in the corrective action plan, well integrity of all monitoring wells listed in Permit Condition V.A.5. shall be monitored by the Permittee and reported to the Department according to the following schedule:

V.D.3.d.i. Well depths shall be measured at least once a year;

V.D.3.d.ii. A visual well inspection for evidence of well damage shall be performed every sampling event;

V.D.3.d.iii. Sample and analyze for total iron at least annually.

V.D.4. Sampling and Analysis Procedures

V.D.4.a. The Permittee must include and maintain consistent sampling and analysis procedures in the groundwater and surface water monitoring program that are designed to ensure reliable monitoring results of groundwater quality near the regulated unit. At a minimum, the program shall include procedures and techniques for sample collection, sample preservation and shipment, analytical procedure and chain-of-custody control.

V.D.4.b. The sampling and analytical methods must be appropriate for groundwater sampling and accurately measure hazardous constituents in water samples.

V.D.4.c. Samples shall be collected, preserved and transported and a chain-of-custody record maintained in accordance with the procedures specified in SW-846, Test Methods for Evaluating Solid Waste: Physical/Chemical Methods, September, 1986, EPA and Attachment V.3. Quality assurance and quality control (QA/QC) procedures for field and laboratory analyses shall be followed as specified in SW-846, unless otherwise specified under Permit Condition V.D.4.e.

V.D.4.d. In addition to the sampling and analysis procedures described in Attachment V.3., the Permittee shall:

V.D.4.d.i. Provide a reference point for each well, established by a licensed surveyor in reference to a benchmark;

V.D.4.d.ii. Determine the presence or absence of immiscible layers and the thickness

if present of such layers at each well at each sampling event;

V.D.4.d.iii. The Permittee shall use bailer rope as specified in the TEGD and change the rope each time a bailer is used;

V.D.4.d.iv. Bailers shall be rinsed with solvent following the distilled water rinse in accordance with the TEGD;

V.D.4.d.v. Samples for semi-volatile organics shall be collected in a volume of at least one liter.

V.D.4.e. The Permittee shall ensure that all laboratory analyses undertaken as part of the Permit contain adequate quality assurance and quality control (QA/QC). The laboratory must be capable of evaluating quality control procedures as specified in SW-846. The laboratory must also have quality control and backup information available for specific analyses, which can be assessed if necessary. Groundwater and surface water samples shall be analyzed according to the methods and procedures specified in SW-846 in addition to the following:

V.D.4.e.i. The Permittee shall submit all laboratory QA/QC documentation and supporting data required under the schedule outlined in Permit Condition V.E.13. The Permittee shall retain, either at the laboratory or at the facility, the raw organics information for the required sampling and analysis, including gas chromatographic printouts, mass spectral analyses, QA/QC surrogate and spiking results, etc. These data shall be retained for a period of not less than three years.

V.D.4.e.ii. The criteria for accepting or rejecting data shall follow the requirements of SW-846.

V.D.5. Groundwater Elevation

V.D.5.a. The Permittee shall determine the groundwater surface elevation using the methods and procedures outlined in Attachment V.5. in all wells at the land treatment unit on a quarterly basis unless otherwise instructed by the Department.

V.D.5.b. The Permittee shall determine the groundwater flow rate and direction in the uppermost aquifer during spring runoff, high groundwater table, and low groundwater season and submit updated quarterly groundwater contour maps to the Department in the first quarter of each year.

V.D.6. Monitoring Parameters

V.D.6.a. For purposes of the compliance monitoring program as specified in Permit Condition V.E., there shall be two classes of parameters for measurement and analysis defined as follows:

V.D.6.a.i. Principal Hazardous Constituents (PHCs)

The first class consists of the set of organic hazardous constituents listed in Attachment V.2. The PHCs include the Modified Skinner List and organics previously detected in the groundwater. These are compounds which are found in refinery waste and/or have been detected in the groundwater and provide a reliable indication of the presence of hazardous constituents in the groundwater.

V.D.6.a.ii. Appendix IX Parameters

This list is found in the Appendix IX to 40 CFR Part 264. It was developed by the EPA to detect suspected contamination at land based hazardous waste treatment storage and disposal facilities. Appendix IX compounds are considered analyzable in groundwater by available methods specified in SW-846 and are listed in Attachment V.4. The Appendix IX parameter list may be modified under Permit Condition V.E.2.

V.D.6.b. The Principal Hazardous Constituents shall be used as compliance monitoring parameters. They will be sampled on a quarterly basis and will be subjected to statistical evaluation as defined in Permit Condition V.E.6. Appendix IX parameters shall be monitored in accordance with Permit Condition V.E.2.

V.D.7. Background Water Quality

V.D.7.a. Background groundwater levels for the PHCs in the aquifer underlying the land treatment unit are based on previous sampling which showed below detection levels in upgradient wells. Background levels for all other hazardous constituents are assumed to be below detection, i.e. lower than the Groundwater Protection Standard established in Permit Condition V.C.

V.D.7.b. The Permittee may petition to the Department to modify the background data, based on future monitoring results obtained during the term of this Permit. The Permittee may use analytical data collected from a background well that meets the requirements of Permit Condition V.A.5.f. for the groundwater background data.

V.D.8. Other Conditions

V.D.8.a. The Permittee shall monitor all wells listed in Permit Condition V.A.5. quarterly at a minimum in the compliance monitoring program and as otherwise specified below.

V.D.8.b. The Department may modify parameters or methods of analysis, including statistical analysis, for any samples upon written notice to the Permittee, if necessary. Conditions requiring modification may include maintaining or upgrading the quality or type of data produced by the Permittee to account for background conditions, future conditions such as availability of improved

analytical methods, the presence of better indicators, or more easily detectable parameters.

V.D.8.c. Recordkeeping

V.D.8.c.i. The Permittee shall enter all monitoring, testing and analytical data into the operating record as required by Condition II.J. of this Permit.

V.D.8.c.ii. The Permittee shall provide the Department with groundwater monitoring data in accordance with the Conditions of this Module.

V.D.8.d. Reporting Requirements

V.D.8.d.i. The Permittee shall provide to the Department within 30 days of the date the Permittee (or any representative of the Permittee to process or evaluate analytical data) receives the analytical results, a report containing the information required under Permit Condition V.E.13.a. and any additional analyses deemed appropriate by the Permittee to explain exceeding the concentration limits. Appropriate QA/AC results shall accompany all reported data.

V.D.8.d.ii. The Permittee shall report all information required under this Module in accordance with the schedule outlined in Permit Condition V.E.13.

V.D.8.e. Permit Modification

V.D.8.e.i. If the Permittee or the Department determines that the compliance monitoring or corrective action program required by this Permit no longer satisfies the requirements of the regulations, the Permittee must, within 90 days of this determination, submit an application for a permit modification to make any appropriate changes to the program which will satisfy the regulation.

V.D.8.e.ii. The Permittee must assure that monitoring and corrective action measures necessary to achieve compliance with the groundwater protection standard under Permit Condition IV.C. are taken during the term of the Permit modification and plan approval.

V.E. COMPLIANCE MONITORING REQUIREMENTS

V.E.1. The compliance monitoring program and assessment shall apply to all wells identified in Permit Condition V.A.5. and shall extend throughout the compliance period as defined in Permit Condition V.E.3. The compliance monitoring program shall consist of quarterly sampling of:

V.E.1.a. The Principal Hazardous Constituents listed in Attachment V.2.

V.E.1.b. Any additional hazardous constituents detected during the monitoring performed under Permit Condition V.E.2.

V.E.1.c. Any additional hazardous constituents the Department determines to be appropriate indicator parameters. Should the Department make such a determination, the Department shall notify the Permittee in writing of additional monitoring requirements.

V.E.2. The Permittee must analyze samples from all monitoring wells identified in Permit Condition V.A.5. for all constituents contained in the "Appendix IX" list in Attachment V.4. on an annual basis to determine whether additional hazardous constituents are present in the uppermost aquifer.

V.E.2.a. The Permittee may petition to the Department for a modification of the Appendix IX list in Attachment V.4. Such a petition shall contain:

V.E.2.a.ii. A list of Appendix IX compounds or groups of compounds reasonably expected to be found in or derived from the stored waste; and

V.E.2.a.ii. A justification for elimination of any compound from the annual Appendix IX monitoring requirement.

V.E.2.b. If the Permittee finds Appendix IX constituents in the groundwater that are not identified in the Permit as principal hazardous constituents, the Permittee must report the concentrations of these additional constituents to the Department within seven days of the date the Permittee or a representative of the Permittee receives the analytical results.

V.E.3. The compliance period is the number of years equal to the active life of the land treatment unit (including the closure period). If the Permittee is engaged in a corrective action program at the end of the compliance period or is in the process of designing a corrective action program or modifying the Permit for corrective action, the compliance period is extended until the Permittee can demonstrate that the Groundwater Protection Standard of Permit Condition V.C. has not been exceeded for a period of three consecutive years.

V.E.4. The Department may require any additional field tests, monitoring well installation, or further analytical tests necessary to adequately assess the horizontal and vertical rate and extent of migration of the contaminants, including the unsaturated zone routes of migration.

V.E.5. The Permittee must ensure that monitoring and corrective action measures necessary to achieve compliance with the Groundwater Protection Standard are taken during the compliance monitoring period.

V.E.6. The Permittee must determine whether there is a statistically significant increase over the concentration limits for any hazardous constituents each time the Permittee determines the concentration of hazardous constituents in the groundwater. A statistically significant increase shall be determined as follows:

V.E.6.a. If a hazardous constituent is detected in a well that showed no concentration of that constituent in the previous sampling event, a statistically significant increase for that constituent shall be any value greater than the concentration limit for that constituent as defined in Permit Condition V.D.1.b.

V.E.6.b. If a hazardous constituent is detected in a well that had measured concentrations of that parameter in previous sampling events, a statistically significant increase for that parameter shall be any value greater than the concentration limit as defined in Permit Condition V.D.1.b. and that value determined to be the upper tolerance limit with 95% coverage as calculated using the procedure outlined in Attachment V.5. or using an alternative statistical test approved by the Department.

V.E.7. The Permittee shall determine the groundwater surface elevation on a quarterly basis in all wells at the site unless otherwise instructed by the Department. The Permittee shall continue to determine the groundwater flow rate and direction in the uppermost aquifer on a quarterly basis and submit a summary report during the first quarter of each calendar year.

V.E.8. The Department will establish the Groundwater Protection Standard under Condition V.C. of this Permit, such that if a Principal Hazardous Constituent listed in Attachment V.2. is identified and the difference between the respective concentration limit listed in Attachment V.2. and the background value of that constituent is not statistically significant, the background value of the constituent will be used as the concentration limit.

V.E.9. The Permittee shall determine whether there is a statistically significant increase over critical levels established for each hazardous constituent under Permit Condition V.E.6. each time the concentration of hazardous constituent(s) is determined at a monitoring well.

V.E.10. If the Permittee determines that there has been a statistically significant increase under Permit Condition V.E.6. for any hazardous constituent at any monitoring well he or she shall:

V.E.10.a. Notify the Department of this finding in writing within seven days. The notification shall indicate which concentration limits have been exceeded; and

V.E.10.b. Submit to the Department for approval, in accordance with the reporting schedule under Permit Condition V.E.13.a., a report addressing the finding that includes:

V.E.10.b.i. A discussion of possible causes of the increase; and

V.E.10.b.ii. A detailed description of how the corrective action plan will be modified

to achieve compliance with the groundwater protection standard specified in Permit Condition V.C., and a plan for a groundwater monitoring program that will demonstrate the effectiveness of the modified plan; or

V.E.10.b.iii. Justification for continued implementation of the corrective action plan already in place without modification.

V.E.11. The Permittee may demonstrate that a source other than the regulated unit under these Permit requirements caused the increase above the Groundwater Protection Standard including increases resulting from sampling, analytical or evaluation error. While the Permittee may make a demonstration in addition to, or in lieu of, submitting a plan approval modification application under Permit Condition V.E.10.b., he or she is not relieved of the requirement to submit a plan approval modification application within the time specified, unless the demonstration make under this paragraph successfully shows that a source other than the regulated unit caused the increase.

In making a demonstration under this paragraph, the Permittee shall:

V.E.11.a. Notify the Department in writing in seven days that he or she intends to make a demonstration under this paragraph;

V.E.11.b. Within 90 days, submit a report to the Department which demonstrates that a source other than a regulated unit under these provisions caused the standard to be exceeded;

V.E.11.c. Within 90 days, submit to the Department an application for a plan approval modification and permit modification to make any appropriate changes to the compliance monitoring program at the facility; and

V.E.11.d. Continue to monitor in accordance with the compliance monitoring program established under this section.

V.E.12. If the Permittee determines that the compliance monitoring program no longer satisfies the requirements of this section, he or she shall, within 90 days, submit an application for a plan approval and permit modification to make any appropriate changes to the program.

V.E.13. The Permittee shall report information required in this section in accordance with the following schedule:

V.E.13.a. Static water level readings and analytical results of quarterly sampling events shall be reported to the Department in accordance with Permit Condition V.D.8.d.i. On a quarterly basis, the Permittee shall report:

V.E.13.a.i. Analytical methods used, including method number references;

V.E.13.a.ii. Practical quantitation limits (PQLs) for every parameter tested;

V.E.13.a.iii. Quality control information pertinent to analysis including blanks, duplicates, and acceptance limits for spikes;

V.E.13.a.iv. Laboratory used;

V.E.13.a.v. Data sheets provided by the laboratory;

V.E.13.a.vi. Method detection limits (MDL) for every parameter tested;

V.E.13.a.vii. Low-level groundwater data shall be reported as follows:

Analyte Concentration	Report
<MDL	Not reported (Give MDL value)
≥MDL but <PQL	Found but not quantified
≥PQL	Numerical value reported

V.E.13.a.viii. PQLs for volatile organic compounds in groundwater by SW-846, Method 8020 may be no greater than ten times the method detection limits given in Table 1 of the method. Analytical results shall be reported in the format given in Condition vii. above.

V.E.13.a.ix. PQLs for semivolatile organics, SW-846, Method 8270, may not exceed those listed for groundwater in Table 2 of the method;

V.E.13.a.x. The Permittee shall submit to the Department the Quality Assurance Plan and the name of a contact person for each analytical laboratory which they use;

V.E.13.a.xi. Any compound not listed in Attachment V.2. but detected during analysis;

V.E.13.a.xii. A determination of whether there has been a statistically significant increase as defined in Permit Condition V.E.6.; and

V.E.13.a.xiii. Information required under Permit Condition V.E.13.d. in the event that there has been a statistically significant increase under Permit Condition V.E.6.

V.E.13.b. Analytical results of the annual Appendix IX sampling event shall be shall be reported to the Department in accordance with Permit Condition V.D.8.d.i. The Permittee may consider the annual Appendix IX sampling event as one of the required quarterly sampling events as long as all compounds listed in Attachment V.2. are included in the Appendix IX sampling. The Permittee shall follow the reporting requirements in Permit

Condition V.E.13.a.i-xiii.

V.E.13.c. An annual report shall be submitted by April 1 of every year that includes the following:

V.E.13.c.i. Static water level measurements taken at all wells at the site throughout the year shall be summarized as four piezometric maps showing lines of equipotential for each quarter;

V.E.13.c.ii. Quarterly sampling results shall be summarized and submitted to the Department along with appropriate QA/QC date;

V.E.13.c.iii. Measurements of the depth to the bottom of each well identified in Permit Condition V.A.5.

V.E.13.d. If the Permittee finds Appendix IX constituents in the groundwater that are not identified under the Groundwater Protection Standard in Attachment V.2., the Permittee must report the concentrations of these constituents to the department within eleven days of the date of the Permittee or a representative of the Permittee having received the analysis.

V.F. CORRECTIVE ACTION REQUIREMENTS

V.F.1. Groundwater monitoring at the land treatment unit has demonstrated contamination in downgradient wells CEN-3 and CEN-10. A groundwater corrective action program is required to remediate groundwater contamination at permitted facilities in accordance with 40 CFR 264.100, and 40 CFR 270.14(c)(8)(iii), incorporated by reference in ARM 16.44.702 and 16.44.120, respectively. The Permittee shall:

V.F.1.a. Take corrective action to ensure that the regulated unit under these requirements is in compliance with the Groundwater Protection Standard under Permit Condition V.C.

V.F.1.b. Implement a corrective action program that prevents hazardous constituents from exceeding their respective concentration limits at the compliance points by removing the hazardous constituents or treating them in place. The plan will list the specific measures which shall be taken.

V.F.1.c. The Permittee shall begin corrective action within a reasonable time. The Department will specify the time period upon approval of the Corrective Action plan addressed in Permit Condition V.F.2.

V.F.1.d. In conjunction with a corrective action program, the Permittee shall establish and implement a groundwater monitoring program to demonstrate the effectiveness of the corrective action program. Such a monitoring program may be based on the requirements for a compliance monitoring program under 40 CFR 264.99 and Permit Condition V.E.

V.F.1.e. Corrective action measures under this permit may be terminated once the concentration of hazardous constituents under 40 CFR 264.93 and Condition IV.E. of this Permit meet the criteria of Permit Condition V.C. for a period of three consecutive years.

V.F.1.f. The Permittee shall continue corrective action measures during and beyond the compliance period for as long as necessary to achieve compliance with the groundwater protection standard.

V.F.1.g. The Permittee shall report semi-annually by April 1 and October 1 in writing to the Department on the effectiveness of the corrective action program.

V.F.1.h. If the Permittee determines that the corrective action is no longer needed or no longer satisfies the requirements of this section, he or she shall, within 90 days, submit an application for plan approval and permit modification to the Department.

V.F.2. The Permittee shall submit to the Department, no later than January 1, 1992, a detailed corrective action plan, in the form of a permit modification application, for the land treatment unit. The corrective action plan shall outline in detail the following information:

V.F.2.a. Location

Location of all elements of the corrective action system, including aeration systems, piezometers, pumpout or injection wells, activated carbon units or other treatment systems, etc. must be shown on a topographic map.

V.F.2.b. Construction Detail

Include engineering specifications and technical drawings for all elements of the corrective action system.

V.F.2.c. Treatment Technologies

The Permittee shall discuss the selected treatment technologies in detail and shall present evidence that the treatment technologies will be effective, appropriate, and in regulatory compliance for groundwater remediation at the site.

V.F.2.d. Effectiveness of Corrective Action Program

Present an estimate of the length of time it will take to achieve corrective action goals.

V.F.2.e. Additional Hydrogeological Data

Provide any additional hydrologic data used in developing the corrective

action program.

V.G. CLOSURE/POST-CLOSURE

V.G.1. During the closure period the Permittee shall:

V.G.1.a. Continue groundwater monitoring in compliance with Permit Condition V.E. and the approved correction plan.

V.G.1.b. If the Permittee is engaged in a corrective action program at the completion of closure, the Permittee shall continue groundwater monitoring in compliance with Permit Condition V.E. and comply with the corrective action program requirements specified in Permit Condition V.F.

V.G.1.c. When the compliance period has been completed, the Permittee shall submit a Permit modification for a post-closure detection monitoring program.

V.G.2. During the post-closure period the Permittee shall:

V.G.2.a. Monitor under this Condition if all of the regulated unit identified in Permit Condition V.A.1. has completed closure in compliance with Permit Module III and if groundwater corrective action has been completed.

V.G.2.b. Post-closure care for the land treatment unit must begin after completion of closure all areas and continue for at least 30 years after that and must consist of monitoring and reporting in accordance with the requirements of this Permit unless modified by the Department.

V.G.2.c. The Department may modify the post-closure monitoring and reporting requirements in the following ways:

V.G.2.c.i. Shorten the post-closure care period; or

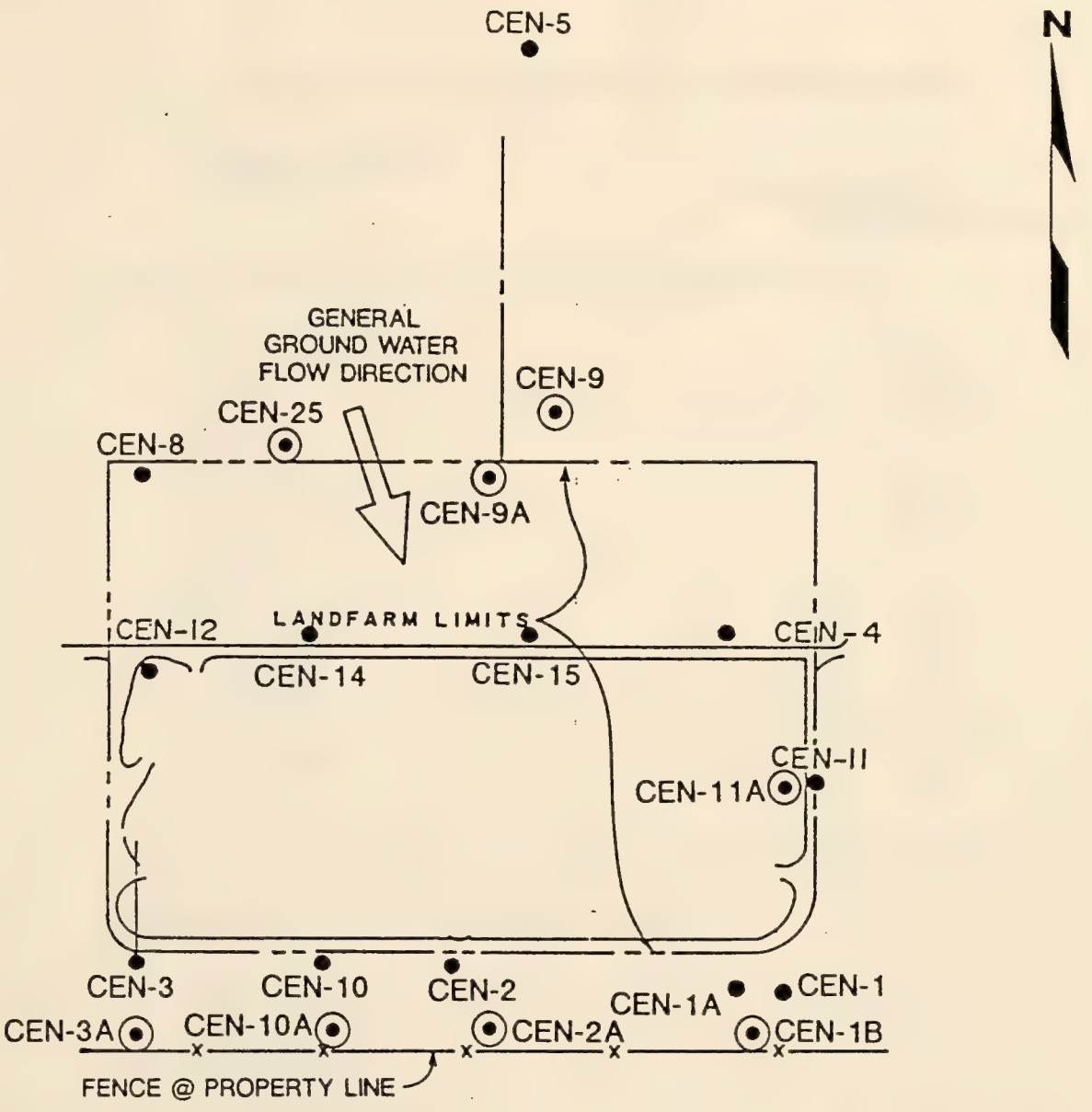
V.G.2.c.ii. Lengthen the post-closure care period; or

V.G.2.c.iii. Change the list of parameters; or

V.G.2.c.iv. Change the frequency of sampling events.

MODULE V - ATTACHMENTS

Attachment V.1.:	Groundwater Compliance Monitoring Network
Attachment V.2.:	Groundwater Protection Standard
Attachment V.3.:	Sampling and Analysis Plan
Attachment V.3.a.:	Addendum to Sampling and Analysis Plan
Attachment V.4.:	Appendix IX Compounds
Attachment V.5.:	Statistical Method for Calculating Upper Tolerance Limits
Attachment V.6.:	Procedures for Well Abandonment



ERM-Southwest, inc.
NEW ORLEANS, LOUISIANA HOUSTON, TEXAS

DATE 8/22/90 W.O.NO. 3011A03

R675

FIGURE 3-5A
PROPOSED REINSTALLATION OF MONITOR WELLS
AND INSTALLATION OF ADDITIONAL UPGRADIENT WELLS
Cenex Refinery Landfarm
Laurel, Montana

GROUNDWATER PROTECTION ACTION STANDARD

Principal Hazardous Constituent	Concentration Limit (micrograms per liter)
1. Metals (PQLs set by Method 6010, SW-846 except for *)	
Antimony	32
Arsenic	50*
Barium	1,000*
Beryllium	.3
Cadmium	10*
Chromium	50*
Cobalt	7
Copper	6
Lead	50*
Mercury	2*
Nickel	15
Selenium	10*
Silver	50*
Vanadium	8
Zinc	2

*Maximum concentration of constituents set in 40 CFR 264.94(a)(2)

2. Volatiles (PQLs set by Method 8240, SW-846)	
Benzene	5
Carbon disulfide	5
Chlorobenzene	5
Chloroform	5
1,2-Dichloroethane	5
1,4-Dioxane	5
Ethylbenzene	5
Ethylene dibromide	5
Methyl ethyl ketone	5
Styrene	5
Toluene	5
Total Xylenes	5
Isopropyltoluene	5
1,2,4-Trimethylbenzene	5
1,3,5-Trimethylbenzene	5

3. Semi-volatile Base/Neutral Extractable Compounds (PQLs set by Method 8270, SW-846)

Anthracene		10		
Benzo(a)anthracene		10		
Benzo(b)fluoranthene		10		
Benzo(k)fluoranthene		10		
Benzo(j)fluoranthene		10		
Benzo(a)pyrene			10	
Bis(2-ethylhexyl)phthalate	10			
Butyl benzyl phthalate		10		
Chrysene			10	
Dibenz(a,h)acridine		10		
Dibenz(a,h)anthracene		10		
Dibenz(a,h)anthracene		10		
1,4-Dichlorobenzene		10		
1,2-Dichlorobenzene		10		
1,3-Dichlorobenzene		10		
Dimethyl phthalate		10		
7,12-Dimethylbenz(a)anthracene	10			
Dimethyl phthalate		10		
Di(n)butyl phthalate	10			
Di(n)octyl phthalate	10			
Fluoranthene		10		
Indene		10		
Methyl chrysene		10		
1-Methyl naphthalene		10		
Naphthalene		10		
Phenanthrene				10
Pyrene		10		
Pyridine			10	
Quinoline			10	
Fluorene			10	
2-Methylnaphthalene			10	

4. Semi-volatile Acid-Extractable Compounds (PQLs set by Method 8270, SW-846)

Benzenethiol		10		
o-cresol			10	
m-cresol			10	
p-cresol			10	
2,4-Dimethylphenol		10		
2,4-Dinitrophenol				10
4-Nitrophenol			10	
Phenol			10	

APPENDIX E

GROUND WATER SAMPLING AND ANALYSIS PLAN

Cenex Refinery
Laurel, Montana

ERM-Southwest, inc.

RECEIVED
JUN 26 1990
MONTANA DEPARTMENT OF HEALTH
AND ENVIRONMENTAL SCIENCES
SOLID & HAZARDOUS WASTE BUREAU

APPENDIX E

GROUND WATER SAMPLING AND ANALYSIS PLAN

Cenex Refinery
Laurel, Montana

Robert E. Robinson

J. Martin Briggs, P.E.

Brian P. Flynn, P.E.
Principal

November 3, 1985
Revised: June 25, 1990

W.O. #30-11

Prepared by

ERM-SOUTHWEST, INC.
16000 Memorial Drive, Suite 200
Houston, Texas 77079
(713) 496-9600

TABLE OF CONTENTS

Section		Page
1	INTRODUCTION	APP. E-1
2	SAMPLE COLLECTION PROCEDURES	APP. E-2
	2.1 Sample Collection Equipment	APP. E-2
	2.2 Fluid Measurement and Sample Collection Procedures	APP. E-2
	2.2.1 Measuring Ground Water Levels	APP. E-3
	2.2.2 Measuring Immiscible Fluid Layers	APP. E-4
	2.2.3 Sampling of Immiscible Layers	APP. E-4
	2.3 Well Evacuation	APP. E-5
	2.4 Sample Collection and Field Analyses	APP. E-6
3	SAMPLE PRESERVATION AND SHIPMENT	APP. E-11
4	SAMPLE SCHEDULE	APP. E-13
5	ANALYTICAL PROCEDURES	APP. E-19
6	CHAIN-OF-CUSTODY CONTROL	APP. E-20
7	QUALITY ASSURANCE	APP. E-22
	7.1 Field Quality Assurance	APP. E-22
	7.2 Laboratory Quality Control Program	APP. E-23
8	STATISTICAL METHODS	APP. E-24
	8.1 Calculations of Background Comparison	APP. E-24
	8.2 Comparison Procedures	APP. E-26
	8.3 Statistical Analysis of New Downgradient Wells	APP. E-29

ATTACHMEMT A - EXAMPLE CALCULATION - HYPOTHETICAL DATA

APPENDIX E
GROUND WATER SAMPLING AND
ANALYSIS PLAN

Cenex Refinery
Laurel, Montana

1 - INTRODUCTION

This Ground Water Sampling and Analysis Plan (SAP) is a revision to the Part B Application submitted November 3, 1985. The revised SAP addresses the revisions requested by the State of Montana, Department of Health and Environmental Sciences (MDHES) in their field investigation report transmitted July 18, 1989 and a Part B NOD letter dated February 28, 1990.

The SAP is a detailed description of activities that occur during sampling events. The following sections describe sample equipment required, well evacuation, sample preservation and shipment, schedule, analytical procedures and methods, chain-of-custody procedures, field quality assurance, and laboratory QA/QC.

T340

2 - SAMPLE COLLECTION PROCEDURES

2.1 Sample Collection Equipment

Equipment needed for collecting representative samples and field analysis of ground water are:

(1) 100-ft. fiberglass, plastic, or steel measuring tape with weighted bottom or water level indicator consisting of an electrode with a closed circuit indicator light or audible alarm with a 100-ft. cable capable of measuring to the nearest 0.01 foot;
(2) Hydrocarbon detection device (oil/water interface probe);
(3) Several gallons of distilled/deionized water and nonphosphate detergent;
(4) Paper towels;
(5) Plastic sheeting or large size garbage bags;
(6) Bottom filling PVC bailer for each well and rope or a water sampling pump;
(7) Graduated bucket;
(8) Sample bottles and containers for field parameter measurements;
(9) Sample bottle labels, custody seals, waterproof marking pen;
(10) Waterproof gloves, safety glasses, hard hat, tyvek coveralls and steel-toed boots;
(11) Peristaltic or hand pump, tubing, filter apparatus, and filters;
(12) pH meter;
(13) Thermometer;
(14) Specific conductivity meter;
(15) Calibration standards for pH and specific conductivity meters;
(16) Preservatives for water samples (dilute HCl, HNO_3, and H_2SO_4);
(17) Shipping and field data forms, field logbook, clipboard, indelible ink pen; and
(18) Ice chest, ice or freezer packs, and strapping tape.

2.2 Fluid Measurement and Sample Collection Procedures

Ground water sampling procedures include: (1) water level and total well depth measurements, (2) measurement and sampling of immiscible phases, (3) removal of standing water in wells, and (4) sample retrieval.

2.2.1 Measuring Ground Water Levels

Procedures for measuring ground water levels include:

(1) Place plastic sheeting around well to protect sampling equipment from potential contamination.

(2) After removing outer casing cap, measure the depth to water in the well. All measurements are made from top of casing.

Using the electronic indicator, drop the probe down the center of the casing and allow cord to go untangled down the well. When the indicator light or audible alarm indicates a closed electric circuit, determine the depth to the water from the top of the well casing. The water level will be measured from a predetermined marked and surveyed point (accurate to 0.01 foot) on top of the well casing. The water level will be measured to the nearest 0.01 foot. If the water level indicator cord is not marked in 0.01 foot increments, then a ruler capable of measuring to 0.01 foot will be used to measure from the nearest one foot mark. Record depth to water, time, and date in the field logbook. Subtract this value from elevation at top of casing to find elevation of water level.

(or)

Using a fiberglass, plastic, or steel 100-ft. tape with a rubber sink stopper, drop the weighted tape down the center of casing. After water is encountered in the well (which is determined audibly by contact of the stopper with the water surface), record the time, date, and depth measurement from the tape from the top of casing to the nearest 0.01 foot. Record depth to water in the field logbook. Subtract the value from the elevation of the top of the casing to determine the water level.

Lower the water level indicator probe or a weighted 100-foot measuring tape to the bottom of the well. Determine the total depth of the well from top of casing. Record the depth measurement in the field logbook. Subtract the measured value from the total depth recorded at the time of installation to determine if any significant silting has occurred.

The water level measurements must be obtained at each sampling point every time water samples are collected. The measurement of total well depth should occur at least annually. Clean probe and wire, or tape using a nonphosphate detergent wash and a double rinse with distilled/deionized water. Wipe dry with a paper towel.

2.2.2 Measuring Immiscible Fluid Layers

If immiscible fluid layers are present or suspected, an oil/water interface probe (e.g., Marine Moisture Control Co., Inc. Ullage Interface probe Model D-2401-2UI, or equivalent) can be used to determine their presence. It is necessary to determine which signals correspond to water and which to an immiscible fluid. Ground the instrument and switch on the probe. Test the instrument for correct operation. Carefully lower the probe down the center of the well casing until the probe indicates a completed circuit. Measure to the nearest 0.01 foot and record in the field logbook the depth to the first fluid layer encountered and whether water or an immiscible fluid was registered. If an immiscible fluid is encountered, lower the probe until water is reached. Measure to the nearest 0.01 foot and record in the field logbook the depth to water.

Continue lowering the probe to determine if an immiscible bottom layer is present and/or until the bottom of casing is reached. Measure to the nearest 0.01 foot and record in the field logbook the immiscible fluid depth, if present, and the bottom of the casing.

The depths, thicknesses, and time of measurements will be entered into the field logbook. All nondedicated equipment used in wells containing immiscible fluids will be decontaminated prior to use in another well.

2.2.3 Sampling of Immiscible Layers

The sampling of an immiscible fluid must take place prior to purging for ground water sampling. Following measurements of the immiscible layer, a clear Teflon® bailer will be used for sampling. Lower the bailer slowly to a depth less than the floating layer/water contact. Remove the bailer and decant off the floating immiscible layer into the appropriate bottles, keeping sample agitation to a minimum. Discard the water into a storage drum for proper disposal. If necessary, continue to collect additional immiscible fluid samples to provide adequate sample volume for analysis.

To collect an immiscible bottom layer sample, lower the bailer slowly to the bottom of the well. Remove the bailer after a minute or two and decant off the water into a container for proper disposal. Pour the bottom layer into the sample jar with minimum agitation. If necessary, continue to collect additional immiscible fluid samples to provide adequate sample volume for analysis.

If the depth to the immiscible layer is less than 25 feet, a peristaltic pump may be used for sampling. To minimize sample agitation and aeration, the pump rate should not exceed 100 ml/min. for sampling. Pumping rate will be noted in the field logbook in the event a pump is used. Tubing used in sample retrieval will be dedicated to the well or disposed of properly after sampling and not reused.

Once the sample bottle is filled, or if no more immiscible fluid is available, cap the bottle immediately. Label the bottle with the well number, date, time, analysis to be performed, and sampler's initials. This information should also be recorded in the field logbook and on the chain-of-custody form. In addition, a sample number should be used to identify the sample from other immiscible layer and ground water samples from the same well on the same day. Immediately refrigerate the samples to 4°C. When measurement and sampling of immiscible layers is completed, purging or well evacuation can proceed. Decontaminate all nondedicated sampling equipment prior to use in another well.

2.3 Well Evacuation

Procedures for removing standing water in the well casing are as follows:

(1) Remove at least three well volumes of standing water or at least all bailable water in the well using a dedicated hand bailer.

To find the volume of well water to be removed, use the following calculation:

$V = 0.489\ r^2h$

Water V = Volume (gallons)
r = casing inside radius (inches)
h = depth of standing water in well (ft).

The depth of standing water (plus floating immiscible fluid, if present) in the well is found by subtracting the depth to water (or floating immiscible layer) measurement from the top depth of the well, measured from the top of the casing. These measurements, along with the calculation results should be recorded in the field logbook.

(2) The discharge from the hand bailer should be measured by a bucket to assure that at least three well water volumes are evacuated prior to sample retrieval. Water will be collected and disposed of properly on the landfarm sur-

face, until the refinery land ban becomes effective. After this point in time, the water must be disposed of in a manner consistent with existing regulations and EPA guidance. Sampling should proceed within 24 hours or after 90 percent recovery. If a pump is used for sampling, pumping rates should be below 100 ml/min during collection of samples.

When "silting in" occurs based on total well depth measurements, a bailer can be used in an attempt to remove the silt. The bailer will act as a plunger to agitate the sediment into suspension. The sediment is then removed with the water. If this method fails, the well may need to be redeveloped.

Following well evacuation, hand bailers will be removed, decontaminated, wrapped in a polyethylene plastic sleeve or other material, labelled and placed in a storage area until the next sampling event.

The bailers will be decontaminated prior to storage by using a nonphosphate detergent wash and a distilled/deionized water rinse. Bailer ropes will be inspected for stains and/or dirt prior to well evacuation and will be replaced as necessary.

2.4 Sample Collection and Field Analyses

Procedures for sample collection and field analysis are as follows:

(1) Allow well to recharge sufficiently to obtain samples. This may require waiting a few minutes to a few hours.

(2) A preferred general collection order for ground water parameters is:

- Volatile organics (VOA)
- Purgeable organic carbon (POC)
- Purgeable organic halogens (POX)
- Total organic halogens (TOX)
- Total organic carbon (TOC)
- Extractable organics
- Total metals
- Dissolved metals

- o Phenols
- o Sulfate and chloride
- o Turbidity
- o Nitrate

This should be applied to the parameters required during the sampling event. Analyses of pH, temperature, and specific conductance will be made in the field at the time of the sampling because these parameters change rapidly and a laboratory analysis might not be representative of the true ground water quality. Remove enough water from the well to determine temperature of water, specific conductivity, and pH or use a YSI (or equivalent) meter with cable linked probe. Record values in the field logbook.

(3) To calibrate the pH meter:

- Use two points (buffer solutions) that bracket the expected pH.
- Place the buffer solutions and the sample into glass or plastic containers. A sufficient amount of solutions and samples should be used to immerse the electrode sensing element. Sample containers should be rinsed.
- Measure the temperature of the buffer solutions. Adjust the instrument temperature compensator, if manual.
- Calibrate the instrument to within $\pm$ 0.05 pH units of buffer solution value. Record in the field logbook.
- Rinse and gently dry the electrode.
- Measure the temperature and pH of the sample. Adjust the instrument temperature compensator if the sample temperature differs more than 2°C from buffer solution. Record values in the field logbook.

(4) To calibrate the specific conductivity meter:

- Select standard solutions that bracket the expected value for the sample.
- Place the standard solutions and the sample into glass or plastic containers. Sample containers should be rinsed. Rinse the conductivity cell with

at least three portions of standard solution prior to measurement.

- Measure the temperature of the standard solutions and calibrate to the standard solutions. Rinse between measurements as noted above. Record the calibration data in the field logbook.
- Rinse with one or more portions of sample and measure conductivity and temperature. Record the measurements in the field logbook.
- If the specific conductivity meter does not automatically correct for temperature, perform temperature corrections specified in SW-846 for Method 9050. Record values in the field logbook.

(5) Discard water in the same manner as the well purge water. Decontaminate the pH probe and conductivity cell using nonphosphate detergent wash and distilled/deionized water rinse.

(6) For collection of total organic carbon and volatile organics, carefully transfer water from the well sampling device (with minimum turbulence) into vials, making sure to overflow the bottle, and immediately cap the vial. Samples will be collected by pouring from the top of the bailer directly into the bottle. Invert the bottle and check for air bubbles. If bubbles are found, discard sample and repeat until successful.

(7) For other samples, transfer water from the well sampling device to the sample bottles. Samples will be collected by pouring from the top of the bailer directly into the bottle. Care should be taken not to agitate sample in order to limit amount of oxygen added to water sample. Bottles should be capped immediately following sample collection. Minimize the number of containers used in order to limit the addition of outside contaminants. Sample bottles should be prepared as specified by EPA regulations, the 1974, 1979 and 1984 EPA "Manual of Methods for Chemical Analysis of Water and Wastes" (EPA 625/6-74-003 and EPA 60/40-79-020), or as specified within this plan. Types of containers and preservatives for analytical parameters are specified in Table E-1. Split samples, field duplicates and field and equipment blanks may be prepared at this time by filling multiple bottles for each type of analysis (see Section 7).

(8) For dissolved metals samples, filtering is performed prior to the addition of HNO_3 to the sample:

T341

TABLE E-1

Sampling and Preservation Procedures for
Cenex Ground Water Monitoring (a)

Parameter	Recommended Container (b)	Preservative	Maximum Holding Time	Minimum Volume Required for Analysis
Indicators of Ground-water Contamination				
pH	T, P, G	Field determined	None	25 ml
Specific conductance	T, P, G	Field determined	None	100 ml
TOC	G, amber, T-lined cap (c)	Cool 4°C HCl to pH <2	28 days	4 x 15 ml
Ground-water Quality Characteristics				
Chloride	T, P, G	4°C	28 days	50 ml
Iron Manganese Sodium	T, P	pH <2 with HNO3	6 months	200 ml
Phenols	G	4°C/H2SO4 to pH <2	28 days	500 ml
Sulfate	T, P, G	Cool, 4°C	28 days	50 ml
EPA - Skinner List Metals				
Antimony Barium Beryllium Cadmium Chromium Cobalt Lead Mercury Nickel Vanadium Arsenic Selenium	T, P	Total Metals pH <2 with HNO3 Dissolved Metals 1. Field filtration (0.45 micron) 2. pH <2 with HNO3	6 months	1,000 ml
Other Ground-water Characteristics of Interest				
Semivolatile, nonvolatile organics	T, G	Cool, 4°C	14 days	60 ml
Volatiles	G, T-lined	Cool, 4°C	14 days	60 ml

(a) References: "Test Methods for Evaluating Solid Waste - Physical/Chemical Methods," SW-846 (3rd Edition 1982).
"Methods for Chemical Analysis of Water and Wastes," EPA-600/4-79-020.
"Standard Methods for the Examination of Water and Wastewater," 16th Edition (1985)

(b) Container Types:
P = Plastic (polyethylene)
G = Glass
T = Fluorocarbon resins (PTFE, Teflon, FEP, PFA, etc.)
P = Polypropylene

(c) Do not allow any head space in container.

- Place unfiltered sample in glass container that has been rinsed one or more times with sample.
- Using a peristaltic pump or hand pump and filter apparatus, filter sample through a 0.45 micron filter (e.g., Geotech GD045700 high capacity disposable filter or equivalent) into sample bottle.
- Add HNO_3 to sample for preservation to lower the pH to 2 or less.
- If filter apparatus is reusable and nondedicated, decontaminate as noted above in (5). If disposable, dispose of properly.

(9) Refrigerate samples in an ice chest.

(10) Prepare a field blank using commercially distilled water and place in ice chest.

(11) Secure well cap and lock well before proceeding to the next well.

3 - SAMPLE PRESERVATION AND SHIPMENT

Sample preservation and shipment procedures are:

(1) Appropriate preservatives should be added to each sample bottle if analyses are not to be performed immediately. Table E-1 lists preservatives to be added for each type of a parameter likely to be analyzed over the life of the facility.

(2) Close sample bottle caps and label bottle. Labels should show sample number, analysis parameter(s), sample source and preservative added, if any, as well as sampler's initials and date and time of sample. An appropriately labeled trip blank sample of distilled water may be added at this time (see Section 7).

(3) Enter all pertinent information in the chain-of-custody form. Complete the Analysis Request form (Figure E-1).

(4) Transfer the samples to an ice chest containing an adequate volume of ice to maintain samples at 4°C until received by the laboratory. Packing material to prevent breakage should be added.

(5) Secure chest top and seal with chain-of-custody tape provided by the lab and/or sturdy shipping tape.

(6) Transport directly to lab or to courier for next-day delivery to lab.

Figure E-1

ANALYSIS REQUEST

Collector _____ Date Sampled _____

ERM-Southwest, Inc. 16000 Memorial Drive, Suite 200
Houston, Texas 77079

For Additional Information call B. P. Flynn, (713) 496-9600

Collector's Sample No.	Laboratory Sample No.	Type of Sample	Field Information

Analysis Requested _____

_____

_____

_____

Notes _____

_____

_____

T342

4 - SAMPLE SCHEDULE

At the request of MDHES, an expanded ground water monitoring program for the Cenex Refinery will be performed. This monitoring program would include analyzing for the parameters shown in Table E-2 on a semi-annual basis. Both ground water samples and immiscible layer samples, if present, will be analyzed for these parameters.

Because of the complicated nature and variability of monitoring requirements at the landfarm, the analytical schedule should be carefully reviewed and checked with Cenex's Environmental Manager before implementation.

It is assumed that the results of this program, in conjunction with a ground water assessment, will be utilized to determine the ground water monitoring schedule (wells, sampling frequency, and parameters) during the effective period of the Part B permit.

If statistical comparisons are required in the future, the methods to be used to evaluate the data are provided in Section 8.

TABLE E-2

Expanded Ground Water Analytical Program

CENEX Refinery
Laurel, Montana

Parameter	EPA Method No.	Detection Limit (mg/l)
pH	150.1	---
SC	120.1	---
TOC	415.2	1.0
Iron	236.1	0.1
Manganese	243.1	0.01
Chloride	325.3	1.0
Sulfate	365.4	1.0
Sodium	273.1	0.04
Phenol	420.1	0.005
Unregulated VOC's - List 1	624	
Bromobenzene		0.005
Bromodichloromethane		0.005
Bromoform		0.005
Bromomethane		0.01
Chlorobenzene		0.005
Chlorodibromomethane		0.005
Chloroethane		0.01
Chloroform		0.005
Chloromethane		0.01
o-Chlorotoluene		0.005
p-Chlorotoluene		0.005
Dibromomethane		0.005
m-Dichlorobenzene		0.005
o-Dichlorobenzene		0.005
1,1-Dichloroethane		0.005
cis-1,2-Dichloroethene		0.005
trans-1,2-Dichloroethene		0.005
Dichloromethane		0.005
1,2-Dichloropropane		0.005
1,3-Dichloropropane		0.005
2,2-Dichloropropane		0.005
1,1-Dichloropropene		0.005
1,3-Dichloropropene		0.005
Ethylbenzene		0.005
Styrene		0.005
1,1,1,2-Tetrachloroethane		0.005
1,1,2,2-Tetrachloroethane		0.005
Tetrachloroethene		0.005
Toluene		0.005
1,1,2-Trichloroethane		0.005
1,2,3-Trichloropropane		0.005
m - Xylene		0.005
p - Xylene		0.005
o - Xylene		0.005

NOTES:
Number of Wells: 6 RCRA wells, 5 Non-RCRA wells and 4 new wells [CEN-21, CEN-22, CEN-23 and CEN-24].

Single determinations per well, except pH adn SC will be four field replicates.

TABLE E-2

Expanded Ground Water Analytical Program

CENEX Refinery
Laurel, Montana

Parameter	EPA Method No.	Detection Limit (mg/l)
Unregulated VOC's - List 2	624	
Ethylene dibromide		0.005
1,2-Dibromo-3-chloropropane		0.005
Unregulated VOC's - List 3	624	
Bromochloromethane		0.005
n-Butylbenzene		0.005
sec-Butylbenzene		0.005
tert-Butylbenzene		0.005
Dichlorodifluoromethane		0.005
Fluorotrichloromethane		0.005
Hexachlorobutadiene		0.005
p-Isopropylbenzene		0.005
Isopropyltoluene		0.005
Naphthalene		0.005
n-Propylbenzene		0.005
1,2,3-Trichlorobenzene		0.005
1,2,4-Trichlorobenzene		0.005
1,2,4-Trimethylbenzene		
1,3,5-Trimethylbenzene		
Regulated VOC's	624	
Benzene		0.005
Carbon Tetrachloride		0.005
p-Dichlorobenzene		0.005
1,1 - Dichloroethylene		0.005
Tetrachloroethylene		0.005
1,1,1-Trichloroethane		0.005
Trichloroethylene		0.005
Vinyl Chloride		0.005
Semivolatiles (GC/MS)	8270	
Acenaphthene		0.005
Acenaphthylene		0.005
Acetophenone		0.005
2-Acetylaminofluorene		0.010
4-Aminobiphenyl		0.005
Anthracene		0.005
Aniline		0.005
Aramite		0.025
Benzo(a)anthracene		0.0078
Benzo(b)fluoranthene		0.0025
Benzo(k)fluoranthene		0.005
Benzo(ghi)perylene		0.005
Benzo(a)pyrene		0.0025
Benzyl alcohol		0.005

NOTES:
Number of Wells: 6 RCRA wells, 5 Non-RCRA wells and 4 new well [CEN-21, CEN-22, CEN-23 and CEN-24].

Single determinations per well, except pH adn SC will be four field replicates.

TABLE E-2

Expanded Ground Water Analytical Program

CENEX Refinery
Laurel, Montana

Parameter	EPA Method No.	Detection Limit (mg/l)
Semivolatiles (GC/MS)	8270	
Bis(2-chloroethoxy)methane		0.005
Bis(2-chloroethyl) ether		0.005
Bis(2-chloro-1-methylethyl)ether		0.005
Bis(2-ethylhexyl)phthalate		0.005
4-Bromophenylphenyl ether		0.005
Butylbenzylphthalate		0.005
p-Chloroaniline		0.005
Chlorobenzilate		0.010
p-Chloro-m-cresol		0.005
2-Chloronaphthalene		0.005
2-Chlorophenol		0.005
4-Chlorophenylphenyl ether		0.005
Chrysene		0.005
o-Cresol		0.005
m-Cresol		0.005
p-Cresol		0.005
Diallate		0.0025
Dibenzofuran		0.005
Di-N-butylphthalate		0.005
Dibenz(a,h)anthracene		0.005
o-Dichlorobenzene		0.005
m-Dichlorobenzene		0.005
p-Dichlorobenzene		0.005
3,3'-Dichlorobenzidine		0.010
2,4-Dichlorophenol		0.005
2,6-Dichlorophenol		0.005
Diethyl phthalate		0.005
0,0-Diethyl-0-2-pyrazinyl phosphorothioate		0.010
Dimethoate		0.010
p-(Dimethylamino)azobenzene		0.005
7,12-Dimethylbenz(a)anthracene		0.025
3,3'-Dimethylbenzidine		0.005
a,a-Dimethylphenethylamine		0.005
2,4-Dimethylphenol		0.0027
Dimethylphthalate		0.005
m-Dinitrobenzene		0.005
4,6-Dinitro-o-cresol		0.025
2,4-Dinitrophenol		0.005
2,4-Dinitrotoluene		0.005
2,6-Dinitrotoluene		0.005
Di-N-octylphthalate		0.005
Dinoseb		0.010
Diphenylamine		0.005
Ethylmethanesulfonate		0.005

NOTES:
Number of Wells: 6 RCRA wells, 5 Non-RCRA wells and 4 new well [CEN-21, CEN-22, CEN-23 and CEN-24].

Single determinations per well, except pH adn SC will be four field replicates.

TABLE E-2

Expanded Ground Water Analytical Program

CENEX Refinery
Laurel, Montana

Parameter	EPA Method No.	Detection Limit (mg/l)
Semivolatiles (GC/MS)	8270	
Fluoranthene		0.005
Fluorene		0.005
Hexachlorobenzene		0.005
Hexachlorobutadiene		0.005
Hexachlorocyclopentadiene		0.005
Hexachloroethane		0.005
Hexachlorophene		0.025
Hexachloropropene		0.005
(Indeno)1,2,3-cd)pyrene		0.005
Isodrin		0.010
Isophorone		0.005
Isosafrole		0.005
Methapyrilene		0.005
Methylmethanesulfonate		0.005
1-Methylnaphthalene		0.005
2-Methylnaphthalene		0.005
Naphthalene		0.005
1,4-Naphthoquinone		0.010
1-Naphthylamine		0.005
2-Naphthylamine		0.005
o-Nitroaniline		0.025
m-Nitroaniline		0.025
p-Nitroaniline		0.025
Nitrobenzene		0.005
o-Nitrophenol		0.005
p-Nitrophenol		0.025
4-Nitroquinoline-1-oxide		0.025
N-Nitrosodi-1-butylamine		0.005
N-Nitrosodiethylamine		0.005
N-Nitrosodimethylamine		0.005
N-Nitrosodiphenylamine		0.005
N-Nitrosodipropylamine		0.005
N-Nitrosomethylethylamine		0.005
N-Nitrosomorpholine		0.005
N-Nitrosopiperidine		0.010
N-Nitrosopyrrolidine		0.010
5-Nitro-o-toluidine		0.005
Pentachlorobenzene		0.005
Pentachloronitrobenzene		0.025
Pentachloroethane		0.005
Pentachlorophenol		0.025
Phenacetin		0.005
Phenanthrene		0.005
Phenol		0.0015
p-Phenylenediamine		0.005
2-Picoline		0.005
Pronamide		0.005

NOTES:
Number of Wells: 6 RCRA wells, 5 Non-RCRA wells and 4 new well [CEN-21, CEN-22, CEN-23 and CEN-24].

Single determinations per well, except pH adn SC will be four field replicates.

TABLE E-2

Expanded Ground Water Analytical Program

CENEX Refinery
Laurel, Montana

Parameter	EPA Method No.	Detection Limit (mg/l)
Semivolatiles (GC/MS)	8270	
Pyrene		0.005
Safrole		0.005
1,2,4,5-Tetrachlorobenzene		0.005
2,3,4,6-Tetrachlorophenol		0.025
Tetraethyldithiopyrophosphate		0.025
o-Toluidine		0.005
1,2,4-Trichlorobenzene		0.005
2,4,5-Trichlorophenol		0.025
2,4,6-Trichlorophenol		0.005
0.0.0-Triethylphosphorothioate		0.025
sym-Trinitrobenzene		0.010
Skinner List Metals		
Antimony	204.1	0.2
Barium	208.1	0.2
Beryllium	210.1	0.005
Cadmium	213.1	0.01
Chromium	218.1	0.02
Cobalt	219.1	0.05
Lead	239.1	0.1
Mercury	245.1	0.0005
Nickel	249.1	0.05
Vanadium	286.1	0.2
Arsenic	206.2	0.01
Selenium	270.2	0.005

NOTES:
Number of Wells: 6 RCRA wells, 5 Non-RCRA wells and 4 new wells [CEN-21, CEN-22, CEN-23 and CEN-24].

Single determinations per well, except pH and SC will be four field replicates.

5 - ANALYTICAL PROCEDURES

All analyses will be performed in accordance with the latest published EPA guidelines as of the date of this application, including:

- EPA SW-846 Test Methods for Evaluating Solid Waste, third edition.
- Standard methods for the Examination of Water and Wastewater, 16th Edition, USPHS 1984.
- New standards as published in the Federal Register, such as "EPA GC/MS Method 624", FR 44(233), December 3, 1979.

Detection limits shall be those recommended for the procedure and analytical instrument specified and in accordance with the target detection limits shown in Table E-2. Analytical procedures will be in accordance with Table E-2.

6 - CHAIN-OF-CUSTODY CONTROL

The sampling person is responsible for the custody and care of the collected samples until the containers have been transferred to the custody of a laboratory or other custodian. After sample collection, chain-of-custody forms should be filled out in legible handwriting, and the bottle should be sealed. Figure E-2 presents a chain-of-custody form for transferring samples to a laboratory. The sampler must assure that the sample containers are in the sampler's physical possession, in view at all times, or stored in a secured area to prevent tampering. Additional information is available from EPA Region III personnel, EPA-600/4-76-049, "Handbook for Sampling and Sample Preservation of Water and Wastewater," or the NWWA/EPA series "Manual of Ground Water Sampling Procedures".

FIGURE E-2

ERM-Southwest, inc.

NEW ORLEANS, LOUISIANA HOUSTON, TEXAS

CHAIN OF CUSTODY RECORD

PROJ. NO.	PROJECT NAME:					NUMBER OF CONTAINERS	ANALYTICAL PARAMETERS							REMARKS
SAMPLERS: (SIGNATURE)														
STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION									

Relinquished by: (signature)	Date/Time	Received By (Signature)	Relinquished By (Signature)	Date/Time	Received By (Signature)
Relinquished by: (signature)	Date/Time	Received By (Signature)	Relinquished By (Signature)	Date/Time	Received By (Signature)
Relinquished by: (signature)	Date/Time	Received (or Laboratory by (Signature)	Date/Time	REMARKS	

Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

16000 Memorial Drive # 200
Houston, Texas 77079
(713) 496-9600

R627

7.1 Field Quality Assurance

Sample collection for well water samples will be conducted according to the procedures outlined in Section 2. These procedures are designed to minimize potential sources of contamination and include the following key elements:

- Use of a dedicated PVC bailer for each well for ground water sampling - eliminates potential for cross contamination between wells.

- Use of a clear Teflon® bailer (e.g., Norton-Norwell Teflon® bailer or equivalent) for immiscible layer sampling. This bailer will be decontaminated between each well.

- Wells will be completely evacuated 24 hours before sampling. Alternately, the wells will be evacuated of at least three well volumes before sampling. Wells will be allowed to recover to at least 90 percent prior to sampling. These actions provide for representative sampling of water quality in the saturated zone.

- Sampling equipment and sample collection vessels will be rinsed twice with well water prior to collection of samples. Rinsing reduces the possibility for contamination and/or dilution of the sample by any residual liquids in equipment or sample bottles.

- Use of trip blanks provided by the laboratory to test contamination during sample transport. Trip blanks are not to be opened, but will be handled in the same manner as regular samples. One trip blank will be provided per sampling event. It will be analyzed for the same parameters as the well samples, except that only GC/MS volatiles will be analyzed if volatiles and semivolatiles are run on well samples.

- One field blank will be collected for each sampling event at a facility. The appropriate bottles will be filled with distilled/ deionized water. It will be analyzed for the same parameters as the well samples, except that only GC/MS volatiles will be analyzed if volatiles and semivolatiles are run on well samples.

- One duplicate sample set will be collected from one monitor well during each routine sampling event. The

identification number for the duplicate should be different than the well number and be entered into the field logbook.

- Careful handling of samples, preservatives and bottles minimizes exposure time and potential for evaporative loss and/or airborne contamination.

- Use of containerized ice whenever possible - maintains 4°C temperature during transit and minimizes breakage.

- Prompt delivery of samples to laboratory - minimizes holding time.

In addition, a field logbook will be maintained containing the following information:

- Identification number of wells
- Well depths
- Water level depths and measurement technique
- Presence (or absence) of immiscible layers and detection method
- Date and time of well evacuation, volume purged, and method used
- Pumping rates
- Type of purging equipment
- Type of sampling equipment
- Date and time of sampling
- Well sampling sequence
- Types of samples and sample containers and preservatives used
- Sample identification numbers (if different from well identification number)
- Parameters requested for analysis
- Sample transporter and distribution
- Field analyses, methods, and calibrations
- Field observations
- Climatic conditions

7.2 Laboratory Quality Control Program

Methods used by subcontracted laboratories to calibrate instruments, make standard dilutions, manage data, clean glassware, and analyze samples are usually available in quality assurance manuals published and periodically revised by the individual lab. Included in such documents is the normal Analytical Control Program used during analyses of samples. Reports of analyses by the laboratory will include a statement regarding their QA/QC program.

NOTE: This section is not to be implemented until the Part B permit has been issued and this statistical method has been approved.

8 - STATISTICAL METHODS

The basic statistical test to be used for comparing downgradient well indicator parameters to upgradient is the average replicate t-test at the 99% confidence level. This test will be used after the Part B is issued. A complete example of its use on hypothetical data is given in Attachment A. The following sections provide a description of the application of the test.

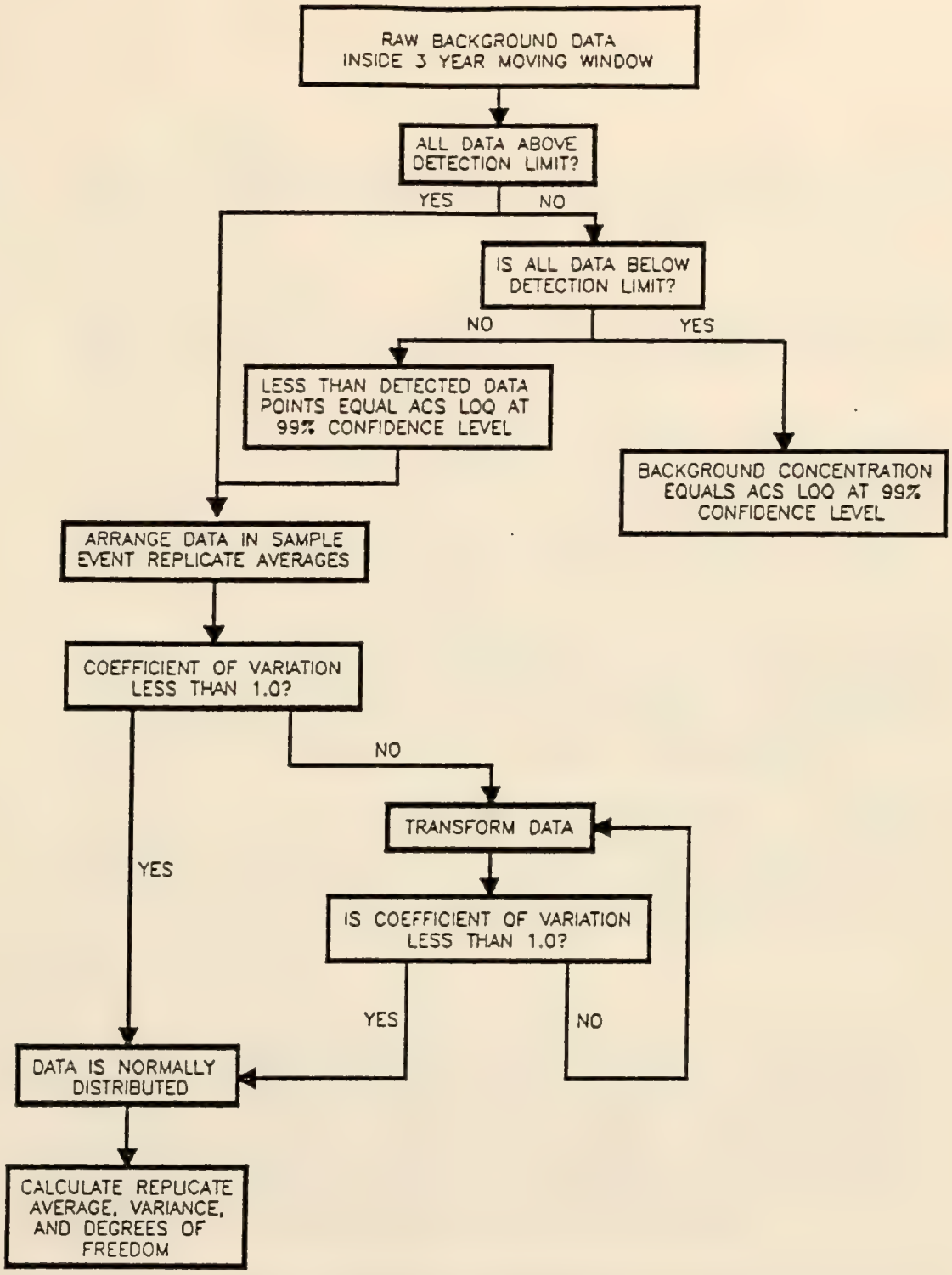
8.1 Calculation of Background Comparison

Figure E-3 illustrates the logic for calculating the background data base for subsequent statistical comparisons. Upgradient (background) well data for the indicator parameters will accumulate over time. After the completion of the first year ground water sampling events, calculation of the background statistics will proceed for each individual indicator parameter. As more data accumulates, it will be added to the background data base until the sample events for three years have accumulated. When the next sample event occurs, the data from the first corresponding sampling period of the three-year cycle will be dropped and the latest data added. This process will continue through subsequent sampling events, thus creating a three-year moving window average replicate background data base.

The raw background data for each individual indicator parameter will be converted into a form suitable for statistical comparison to downgradient data by the following process:

1. First, for each individual indicator parameter, determine if all data is above detection limits. Assuming it is, proceed to Step 2 below.

2. For each background well in each sample event, the data will be averaged. For example, if there are two background wells with duplicate determinations for a particular indicator parameter, and eight sample events have occurred in the three-year moving window, then each set of duplicates will be averaged, resulting in 16 data points (2 wells x 8 events). This constitutes the raw background data shown in the "Arrange Data in Sample Event Replicate Averages" box on Figure E-3.


RAW BACKGROUND DATA INSIDE 3 YEAR MOVING WINDOW
ALL DATA ABOVE DETECTION LIMIT?
YES
NO
IS ALL DATA BELOW DETECTION LIMIT?
NO
YES
LESS THAN DETECTED DATA POINTS EQUAL ACS LOQ AT 99% CONFIDENCE LEVEL
BACKGROUND CONCENTRATION EQUALS ACS LOQ AT 99% CONFIDENCE LEVEL
ARRANGE DATA IN SAMPLE EVENT REPLICATE AVERAGES
COEFFICIENT OF VARIATION LESS THAN 1.0?
NO
YES
TRANSFORM DATA
IS COEFFICIENT OF VARIATION LESS THAN 1.0?
YES
NO
DATA IS NORMALLY DISTRIBUTED
CALCULATE REPLICATE AVERAGE, VARIANCE, AND DEGREES OF FREEDOM

ERM-Southwest, inc.
NEW ORLEANS, LOUISIANA HOUSTON, TEXAS

DATE 06/19/90 W.O.NO. 3011A013F90

FIGURE E-3
CALCULATION OF BACKGROUND COMPARISON
CENEX REFINERY

,1627

3. Next, using the average replicate data points, test for normality by calculating the coefficient of variance, i.e., standard deviation σ_{n-1} divided by overall average.

4. If the coefficient of variation is less than 1.0, the data is normally distributed and you may proceed to calculate the average, variance and degrees of freedom for the average replicate data points.

5. If the coefficient of variation is greater than or equal to 1.0, the average replicate data is non-normally distributed and needs to be transformed and the transformed data retested for normality. Possible transformations include $\log_{10}$, square, square root, etc. Once a successful transformation has been found, Step 4 above can be implemented.

6. If some of the raw background data is below detection limits, the less-than-detected data will be replaced with the American Chemical Society Limit of Quantification (ACS LOQ) at the 99% probability level, and the calculations proceed through Steps 2 to 5 above.

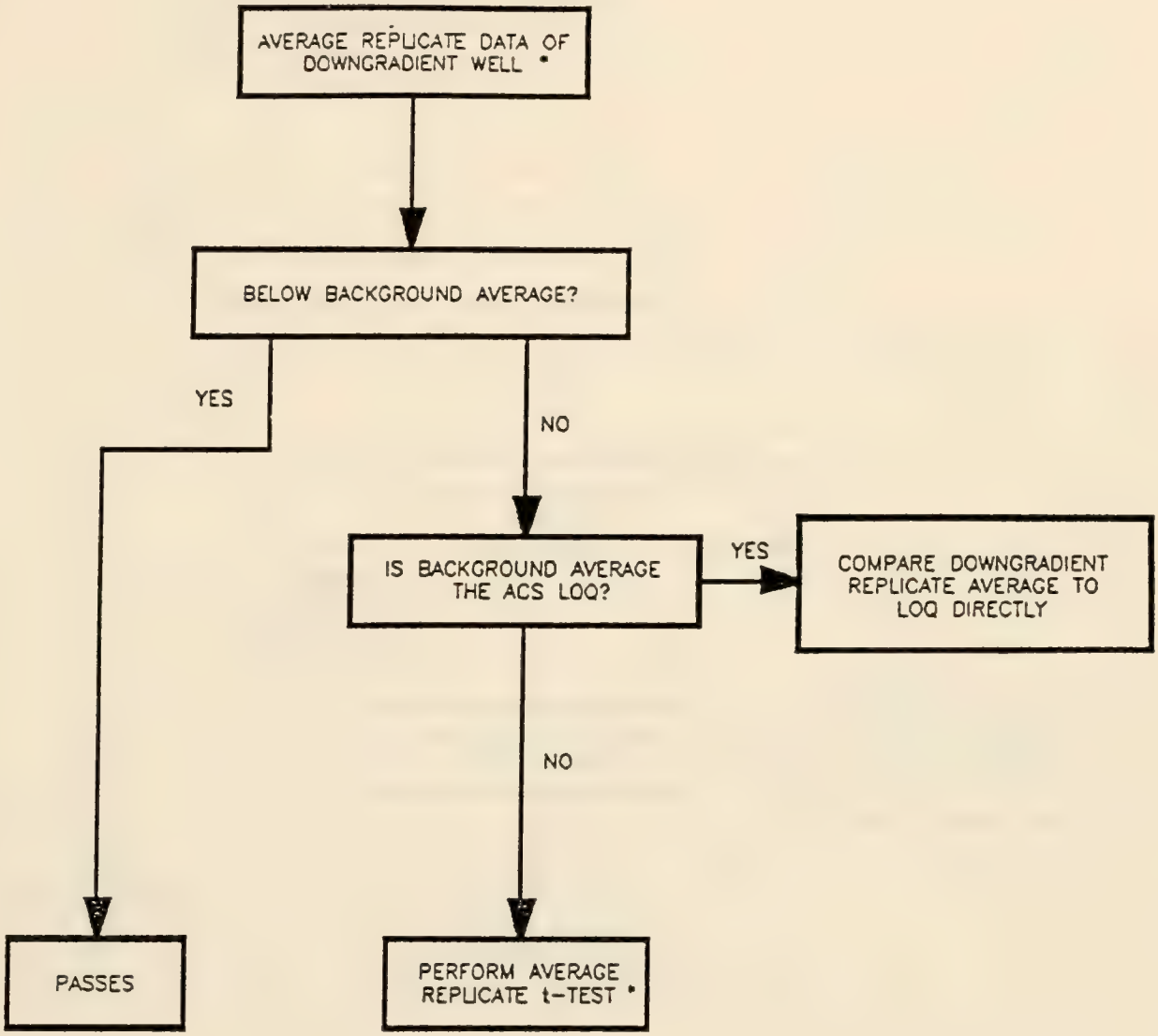
7. If all of the raw background data is below detection limits, the data will be replaced with the American Chemical Society Limit of Quantification (ACS LOQ) at the 99% probability level, and the ACS LOQ becomes the background standard for comparison to downgradient data.

8.2 Comparison Procedures

Figures E-4 and E-5 indicate the comparisons to be performed between downgradient and background data. It must be understood that the downgradient data is the average replicate of the determinations for an individual indicator parameter for one sample event and well only, thus it represents a single data point with no variance. See Attachment A for an example of a comparison. Note that slightly different comparison techniques are used for Primary Drinking Water--non-drinking water parameters.

Non-Primary drinking water indicator parameters will be evaluated as follows:

1. First, determine if the downgradient well average is below the background average for a selected indicator parameter. Assuming it is greater, proceed to Step 2;

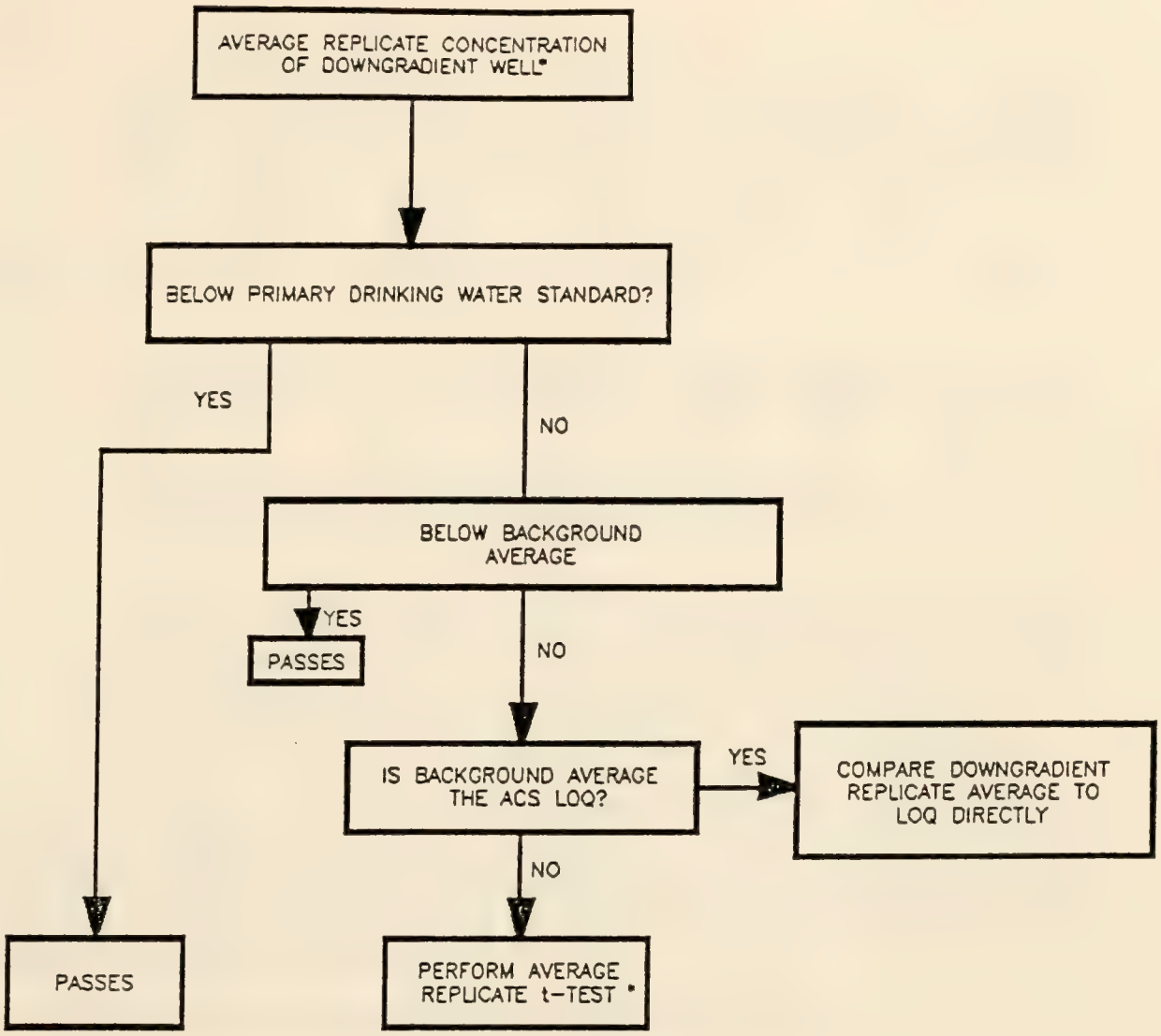


* NOTE THAT IF THE BACKGROUND DATA HAS BEEN TRANSFORMED IN ORDER TO BE NORMALIZED, THE AVERAGE REPLICATE DATA FOR THE DOWNGRADIENT WELL MUST BE TRANSFORMED IN THE SAME FASHION.

ERM-Southwest, inc.
NEW ORLEANS, LOUISIANA HOUSTON, TEXAS

FIGURE E-4
COMPARISON PROCEDURE:
NON-DRINKING WATER STANDARD PARAMETERS
CENEX REFINERY

DATE 06/19/90 | W.O.NO. 3011A014F90



* NOTE THAT IF THE BACKGROUND DATA HAS BEEN TRANSFORMED IN ORDER TO BE NORMALIZED, THE AVERAGE REPLICATE DATA FOR THE DOWNGRADIENT WELL MUST BE TRANSFORMED IN THE SAME FASHION.

ERM-Southwest, inc.
NEW ORLEANS, LOUISIANA HOUSTON, TEXAS

FIGURE E-5
COMPARISON PROCEDURE:
DRINKING WATER STANDARD PARAMETER
CENEX REFINERY

DATE 06/19/90 | W.O.NO. 3011A015F90

2. Compare the background average to ACS LOQ. If the background average is equal to the ACS LOQ, then compare the downgradient value to the ACS LOQ directly. If the background average is greater than the ACS LOQ, perform the averaged replicate t-test on the downgradient average data versus the background average data.

Primary Drinking Water indicator parameters will be evaluated as follows:

1. Determine if the average replicate concentration in the downgradient well is below Primary Drinking Water standards. Assuming they are not, proceed to Step 2;

2. Determine if the average replicate concentration is below the background average. Assuming that it is not, proceed to Step 3;

3. Compare the background average to ACS LOQ. If the background average is equal to the ACS LOQ, then compare the downgradient value to the ACS LOQ directly. If the background average is greater than the ACS LOQ, perform the averaged replicate t-test on the downgradient average data versus the background average data.

If a significant statistical difference is found to exist between background upgradient and downgradient wells, Cenex will immediately obtain additional samples from the appropriate downgradient wells. The additional samples will be split and sent to two separate laboratories to determine if the difference was a result of laboratory error.

8.3 Statistical Analysis of New Downgradient Wells

If a new downgradient well is constructed at a facility unit, the data from the first sample event for this well will be used in the same manner as any other downgradient well at the same unit.

ATTACHMENT A

EXAMPLE CALCULATION - HYPOTHETICAL DATA

EXAMPLE CALCULATION - HYPOTHETICAL DATA
Calculation of Background Statistics

Date of Sample Event to be Calculated: 3/15/90
Background Wells are W-1 and W-2.

Sample events which measured the appropriate indicator parameters during the last three years are limited to: 6/15/89, 9/15/89, 12/15/89 and 3/15/90.

This is the minimum allowable. Raw data is as follows:

Parameter = TOC

	W-1	W-2	
6/15/89	7	8	
	9	9	
	10	10	
	4	<2	(LOQ = 6 -> use 6)
	Avg = 7.5	Avg = 8.25	
9/15/89	8	7	
	8	4	
	9	5	
	7	3	
	Avg = 8.0	Avg = 4.75	
12/15/89	11	<2	(LOQ = 6 -> use 6)
	4	<2	(LOQ = 6 -> use 6)
	10	<2	(LOQ = 6 -> use 6)
	3	<2	(LOQ = 6 -> use 6)
	Avg = 7.0	Avg = 6.0	
3/15/90	6	8	
	6	4	
	7	5	
	7	2	
	Avg = 6.5	Avg = 4.75	

Now, for replicate averages, calculate the coefficient of variation.

Data = 7.5, 8.0, 7.0, 6.5, 8.25, 4.75, 6.0, 4.75

$\sigma_{n-1} = 1.355$ Mean = 6.59 n = 8

$$\text{Coeff. of Variation} = \frac{1.355}{6.59} = 0.205$$

Since this is less than 1.0, data is normal and needs no transformation. See data transformation example at the end if this section to see how to do a transformation, if needed.

T-Test Comparison

Well W-3 is a downgradient well. On 3/15/90, its TOC data was:

11, 9, 14, 15

Average replicate = 12.25

This is greater than the background mean of 6.59. Thus, the t-test must be run.

$$t = \frac{\overline{X_2} - \overline{X_1}}{\sqrt{\frac{n_1 + 1}{n_1} S_1^2}}$$

$$t = \frac{12.25 - 6.59}{\sqrt{\frac{9}{8} 1.355^2}}$$

$$= \frac{5.66}{1.437} = 3.938 = t$$

d.f. = 8 + 1 - 2 = 7

Probability level = 99%

Single tailed comparison.

This t statistic is 2.998

t is greater than 2.998; therefore
W-3 TOC is higher than upgradient TOC.

Data Transformation Example

Replicate Average Data Points: 1, 10, 84, 12, 18, 26

$\sigma_{n-1} = 30.00$

$\bar{X} = 25.2$

C.F. = Coefficient of variation = 30/25.2 = 1.19

This is greater than 1.0. Therefore, transform the data.

Try a base 10 log transformation:

X	log X
1	0
10	1
84	1.92
12	1.08
18	1.25
26	1.41

using log X data:

$\sigma_{n-1} = 0.634$

$\bar{X} = 1.11$

C.F. = 0.57

Since C.F. is <1, the transformation is successful.

T345

TABLE A-1

t Statistic

Degrees of Freedom	t - statistic (at 99% confidence) (1 tailed test)	(2 tailed test)
1	31.821	63.657
2	6.965	9.925
3	4.541	5.841
4	3.747	4.604
5	3.365	4.032
6	3.143	3.707
7	2.998	3.499
8	2.896	3.355
9	2.821	3.250
10	2.764	3.169
11	2.718	3.106
12	2.681	3.055
13	2.650	3.012
14	2.624	2.977
15	2.602	2.947
16	2.583	2.921
17	2.567	2.898
18	2.552	2.878
19	2.539	2.861
20	2.528	2.845
21	2.518	2.831
22	2.508	2.819
23	2.500	2.807
24	2.492	2.797
25	2.485	2.787
26	2.479	2.779
27	2.473	2.771
28	2.467	2.763
29	2.462	2.756
30	2.457	2.750
∞	2.32634	2.57582

ATTACHMENT V.3.a.

CENEX • Post Office Box 909 • Laurel, Montana • 59044-0909 • Phone (406) 252-9326

February 13, 1991

Ms. Rosemary Rowe
RCRA Facilities Coordinator
State of Montana
Department of Health and Environmental Sciences
Solid and Hazardous Waste Bureau
Cogswell Building
Helena, MT 59620

Subject: Response to 12/31/90 Letter, "Comments on CENEX's Response to Closure/Post-Closure NOD"

Dear Ms. Rowe:

We greatly appreciated your comments and guidance during our meeting with you, Roger Thorvilson, Mark Hall and Stephanie Wallace (EPA) in Montana DHES's Helena Offices. Based on our discussions during that meeting we are providing our response to your December 31, 1990 comments letter, a copy of which is attached. We have keyed our following responses to the numbering system used in your letter.

C. Waste Characterization

All additional waste analyses that were not included in the original Part B application were provided in the NOD response date September 7, 1990.

D. Land Treatment Information

The old landfarm unit started receiving waste in 1964.

D-2. Unsaturated Zone Monitoring

(1) Sampling Location

The sampling locations were scattered about the old and new landfarm. The lysimeters and soil sampler were taken in approximately the same location to allow some sort of spatial comparison of the data collected.

RECEIVED
FEB 15 1991
MONTANA DEPARTMENT OF HEALTH AND ENVIRONMENTAL SCIENCES
SOLID & HAZARDOUS WASTE BUR

(2) Sampling Schedule

The list of parameters in Table 6-2 are the ones proposed (and not yet implemented) under final Part B status. The parameters listed in Table A-2 are the actual ones analyzed under Interim Status. Table 6-2 and Table A-2 are found in the September 7, 1990 NOD response.

(3) Soil Sampling

The depth intervals for soil sampling given in Table 6-1 of the September 7, 1990 NOD response were proposed for final Part B Status. The depth of sampling under Interim Status was to a three foot depth and these samples were taken by using a hand auger or by using a pick and shovel to excavate a test pit.

The sampling perform during the Phase I closure of the landfarm requires using a hollow stem auger drill rig and a split spoon sampler for obtaining soil samples from the required depth intervals. The split spoon sampler will be cleaned with alconox and water, followed by a distilled water rinse after each sample attempt.

In some instances, a backhoe may be used for obtaining soil samples for analysis by excavating a test pit. The upper one foot of soil will be scraped off the test area and stockpiled. Then each two foot increment will be removed and placed in a separate stockpile until the desired sampling depth is reached. When the sampling is complete, the soil piles will be replaced into the test pit in the reverse order they were removed with the upper oil being placed back on top. The backhoe bucket will be steam cleaned between test pits.

E. Ground Water

E-2. Ground Water Monitoring

It was proposed to relocate CEN-9 further to the west. This would take it away from a position immediately downgradient of known SWMU's which are North of the new landfarm's eastern half.

During the drilling of all new proposed wells, CENEX will visually monitor drill cuttings and soil samples for evidence of waste. In addition, soil samples will be sealed in plastic bags for several minutes and "sniffed" with an OVM meter. These two actions will ensure that the well is not placed through waste or waste mixed with soil.

E-5. Ground Water Monitoring

The following example indicates how ground water elevations will be corrected for the presence of a hydrocarbon layer in the well. Note that all numbers are for example purposes only.

EXAMPLE CALCULATION

Data

Top of Casing Elevation = 100.00'

Depth to Top of oil from top of casing = 10.42'

Depth to Top of Water from top of casing = 10.08'

Calculation

Oil Layer Thickness = 10.42' - 10.08' = 0.34'

Oil specific gravity = 0.965

Equivalent Water Thickness = 0.34' x 0.965 = 0.33

Depth to Top of Water = 0.33' + 10.08' = 10.41'

Equivalent Water Elevation = 100.00' - 10.41' = 89.59'

E-6.

The results of the seismic refraction study will be available to Montana DHES on March 1, 1991.

E-7.

It is not practical to sample the aquifer material for porosity due to the presence of large cobbles and gravel. Porosity can be estimated for this material from literature values.

The aquifer pump test has already been completed, after DHES's approval of Phase I of the ground water assessment. This approval was given in a letter from DHES dated May 18, 1990. The results of this test will be available March 1, 1991.

E-18.

No response required until a permit is drafted. However, CENEX believes the required monitoring parameters should be defined at the end of the ground water assessment, based on assessment data.

F-1. Closure Plan

The 1% oil and grease cutoff refers to any material taken out of the pits, whether it is waste or affected soils. The 1% cutoff is based upon our consultant's experience. It is believed that in a landfarm environment, when the soil/waste mixture has been degraded to this level, that little or no specific organics can be detected and that the remaining organics are immobile.

Once the one percent oil and grease limit is reached in the soil, a more comprehensive organic analysis will be done to confirm the affected soil removal. The analyses will be for parameters detected during the first Phase I closure sampling done in November 1989 and these are listed below:

- 1,2-Dichloroethane
- Chrysene
- Methylchrysene
- Pyrene

This analysis will be run on a sample composited from eight points located randomly across the bottom of the excavation. If the excavation is larger than the subareas (A through F), then one analysis will be done per subarea. Once the affected soil is being treated on the surface, then the criteria in the closure plan will be followed.

Action levels for each of the 4 constituents will be established either from Subpart S, or by a study of allowable quantities in groundwater based on the assumption of a nearby drinking well. We expect to have this study completd for your review by about Fefruary 22.

CENEX proposes to use 1000 mg/kg of total Pb as a cleanup goal for material excavated form the lead weathering area. This is the same limit as approved by DHES for the new landfarm closure plan. All affected soil above 1000 mg/kg will be disposed of in a appropriate manner.

It is CENEX's intention to utilize as much of the biodegradation capacity of the landfarm as possible to expedite bioremediation of deeper affected soils. The plan was written on the worst case assumption that the entire landfarm was underlain by an average of five feet of affected soil, which could only be spread in a one foot thick lift for bioremediation on top of the landfarm; hence the use of six areas in the landfarm (one being remediated, five to accomplish the remediation). However, it should be noted that when the first area is explored, if it doesn't produce enough affected soil to cover the rest of the landfarm with a one foot thick lift, another area will be immediately investigated, and affected soils spread until the entire area of the landfarm is being used for bioremediation or is being bioremediated. When the bioremediation is complete, the material will be placed backin the excavated areas, and the sequence repeated until the underlying affected soils for the entire landfarm are bioremediated. Thus, because of the one foot thick bioremediation lift thickness limitation, the same amount of material will be remediated on the same amount of time, regardless of whether reconnaissance is done area by area, or all at once. CENEX proposed to do reconnaissance area by area.

Based on six (B-4,5,7,8,9,12) randomly located borings in the old landfarm (See 9/7/90 closure and post closure plan - OLF Area), the expected average thickness of affected soils (>1% and grease) below a three foot depth and above the water table is approximately one foot, versus the five foot closure plan worst case assumption. Thus, the actual closure time should be less than the worst case 5-10 year estimate given to Montana DHES on 12/31/90.

F-3. Closure Cost Estimate

No response currently required.

If you have any further questions, feel free to call me at (406) 628-4311.

Sincerely,

CENEX Refinery

Bernie Gieser

Bernie Gieser
Environmental, Health & Saftey Director

BG/sms:X739
Attachments

ATTACHMENT
Montana DHES Letter of December 31, 1990

cc REP, LJD
Marty Briggs, ERM Southwest
Brian Flynn, ERM Southwest

GROUP 6–B

Acetic acid and other organic acids
Cc [illegible]trated mineral acids
Gr[illegible]2–A wastes

Group 4–A wastes
Other flammable and combustible wastes

Potential consequences: Fire, explosion, or violent reaction.

Source: "Law, Regulations, and Guidelines for Handling of Hazardous Waste." California Department of Health, February 1975.

[46 FR 2872, Jan. 12, 1981]

Appendix VI – Political Jurisdictions[1] in Which Compliance With Section 264.18(a) Must Be Demonstrated

ALASKA
- Aleutian Islands
- Anchorage
- Bethel
- Bristol Bay
- Cordova-Valdez
- Fairbanks-Fort Yukon
- Juneau
- Kenai-Cook Inlet
- Ketchikan-Prince of Wales
- Kodiak
- Lynn Canal-Icy Straits
- Palmer-Wasilla-Talkeena
- Seward
- Sitka
- Wade Hampton
- Wrangell Petersburg
- Yukon-Kuskokwim

ARIZONA
- Cochise
- Graham
- Greenlee
- [illegible]na

CALIFORNIA
- All

COLORADO
- Archuleta
- Conejos
- Hinsdale
- Mineral
- Rio Grande
- Saguache

HAWAII
- Hawaii

IDAHO
- Bannock
- Bear Lake
- Bingham
- Bonneville
- Caribou
- Cassia
- Clark
- Franklin
- Fremont
- Jefferson
- Madison
- Oneida
- Power
- Teton

MONTANA
- Beaverhead
- Broadwater
- Cascade
- Deer Lodge
- Flathead
- Gallatin
- Granite
- Jefferson
- Lake
- Lewis and Clark
- Madison
- Meagher
- Missoula
- Park
- Powell
- Sanders
- Silver Bow
- Stillwater
- Sweet Grass
- Teton
- Wheatland

NEVADA
- All

NEW MEXICO
- Bernalillo
- Catron
- Grant
- Hidalgo
- Los Alamos
- Rio Arriba
- Sandoval
- Sante Fe
- Sierra
- Socorro
- Taos
- Torrance
- Valencia

UTAH
- Beaver
- Box Elder
- Cache
- Carbon
- Davis
- Duchesne
- Emery
- Garfield
- Iron
- Juab
- Millard
- Morgan
- Piute
- Rich
- Salt Lake
- Sanpete
- Sevier
- Summit
- Tooele
- Utah
- Wasatch
- Washington
- Wayne
- Weber

WASHINGTON
- Chelan
- Clallam
- Clark
- Cowlitz
- Douglas
- Ferry
- Grant
- Grays Harbor
- Jefferson
- King
- Kitsap
- Kittitas
- Lewis
- Mason
- Okanogan
- Pacific
- Pierce
- San Juan Islands
- Skagit
- Skamania
- Snohomish
- Thurston
- Wahkiakum
- Whatcom
- Yakima

WYOMING
- Fremont
- Lincoln
- Park
- Sublette
- Teton
- Uinta
- Yellowstone National Park

[1] These include counties, city-county consolidations, and independent cities. In the case of Alaska, the political jurisdictions are election districts, and, in the case of Hawaii, the political jurisdiction listed is the island of Hawaii.

[46 FR 57285, Nov. 23, 1981; 47 FR 953, Jan. 8, 1982]

Appendix VII (reserved)

Appendix VIII (reserved)

Appendix IX – Ground-Water Monitoring List

RCRA 206

APPENDIX IX – GROUND-WATER MONITORING LIST[1]

Common name[2]	CAS RN[3]	Chemical abstracts service index name[4]	Suggested methods[5]	PQL (µg/L)[6]
Acenaphthene	83-32-9	Acenaphthylene, 1,2-dihydro-	8100	200
			8270	10
Acenaphthylene	208-96-8	Acenaphthylene	8100	200
			8270	10
Ac[illegible]	67-64-1	2-Propanone	8240	100
Acetophenone	98-86-2	Ethanone, 1-phenyl	8270	10
Acetonitrile; Methyl cyanide	75-05-8	Acetonitrile	8015	100

APPENDIX IX—GROUND-WATER MONITORING LIST[1]—Continued

Common name[2]	CAS RN[3]	Chemical abstracts service index name[4]	Suggested methods[5]	PQL (μg/L)[6]
2-Acetylaminofluorene; 2-AAF	53-96-3	Acetamide, N-9H-fluoren-2-yl-	8270	10
Acrolein	107-02-8	2-Propenal	8030	5
			8240	5
Acrylonitrile	107-13-1	2-Propenenitrile	8030	5
			8240	5
Aldrin	309-00-2	1,4:5,8-Dimethanonaphthalene, 1,2,3,4,10,10-hexachloro-1,4,4a,5,8,8a-hexahydro-(1α,4α,4aβ,5α,8α,8aβ)-	8080	0.05
			8270	10
Allyl chloride	107-05-1	1-Propene, 3-chloro-	8010	5
			8240	100
4-Aminobiphenyl	92-67-1	[1,1′-Biphenyl]-4-amine	8270	10
Aniline	62-53-3	Benzenamine	8270	10
Anthracene	120-12-7	Anthracene	8100	200
			8270	10
Antimony	(Total)	Antimony	6010	300
			7040	2,000
			7041	30
Aramite	140-57-8	Sulfurous acid, 2-chloroethyl-, 2-[4-(1,1-dimethylethyl)phenoxy]-1-methylethyl ester	8270	10
Arsenic	(Total)	Arsenic	6010	500
			7060	10
			7061	20
Barium	(Total)	Barium	6010	20
			7080	1,000
Benzene	71-43-2	Benzene	8020	2
			8240	5
Benzo[a]anthracene; Benzanthracene	56-55-3	Benz[a]anthracene	8100	200
			8270	10
Benzo[b]fluoranthene	205-99-2	Benz[e]acephenanthrylene	8100	200
			8270	10
Benzo[k]fluoranthene	207-08-9	Benzo[k]fluoranthene	8100	200
			8270	10
Benzo[ghi]perylene	191-24-2	Benzo[ghi]perylene	8100	200
			8270	10
Benzo[a]pyrene	50-32-8	Benzo[a]pyrene	8100	200
			8270	10
Benzyl alcohol	100-51-6	Benzenemethanol	8270	20
Beryllium	(Total)	Beryllium	6010	3
			7090	50
			7091	2
alpha-BHC	319-84-6	Cyclohexane, 1,2,3,4,5,6-hexachloro-(1α,2α,3β,4α,5β,6β)-	8080	0.05
			8250	10
beta-BHC	319-85-7	Cyclohexane, 1,2,3,4,5,6-hexachloro-(1α,2β,3α,4β,5α,6β)-	8080	0.05
			8250	40
delta-BHC	319-86-8	Cyclohexane, 1,2,3,4,5,6-hexachloro-(1α,2α,3α,4β,5α,6β)-	8080	0.1
			8250	30
gamma-BHC; Lindane	58-89-9	Cyclohexane, 1,2,3,4,5,6-hexachloro-(1α,2α,3β,4α,5α,6β)-	8080	0.05
			8250	10
Bis(2-chloroethoxy)methane	111-91-1	Ethane, 1,1′-[methylenebis(oxy)]bis[2-chloro-	8270	10
Bis(2-chloroethyl) ether	111-44-4	Ethane, 1,1′-oxybis[2-chloro-	8270	10
Bis(2-chloro-1methylethyl)ether; 2,2′-Dichlorodiisopropyl ether	108-60-1	Propane, 2,2′-oxybis[1-chloro-	8010	100
			8270	10
Bis(2-ethylhexyl) phthalate	117-81-7	1,2-Benzenedicarboxylic acid, bis(2-ethylhexyl)ester	8060	20
			8270	10
Bromodichloromethane	75-27-4	Methane, bromodichloro-	8010	1
			8240	5
Bromoform; Tribromomethane	75-25-2	Methane, tribromo-	8010	2
			8240	5
4-Bromophenyl phenyl ether	101-55-3	Benzene, 1-bromo-4-phenoxy-	8270	10
Butyl benzyl phthalate; Benzyl butyl phthalate	85-68-7	1,2-Benzenedicarboxylic acid, butyl phenylmethyl ester	8060	5
			8270	10

APPENDIX IX—GROUND-WATER MONITORING LIST[1]—Continued

Common name[2]	CAS RN[3]	Chemical abstracts service index name[4]	Suggested methods[5]	PQL (μg/L)[6]
Cadmium	(Total)	Cadmium	6010	40
			7130	50
			7131	1
Carbon disulfide	75-15-0	Carbon disulfide	8240	5
Carbon tetrachloride	56-23-5	Methane, tetrachloro-	8010	1
			8240	5
Chlordane	57-74-9	4,7-Methano-1H-indene, 1,2,4,5,6,7,8,8-octachloro-2,3,3a,4,7,7a-hexahydro	8080	0.1
			8250	10
p-Chloroaniline	106-47-8	Benzenamine, 4-chloro-	8270	20
Chlorobenzene	108-90-7	Benzene, chloro-	8010	2
			8020	2
			8240	5
Chlorobenzilate	510-15-6	Benzeneacetic acid, 4-chloro-α-(4-chlorophenyl)-α-hydroxy,ethyl ester	8270	10
p-Chloro-m-cresol	59-50-7	Phenol, 4-chloro-3-methyl-	8040	5
			8270	20
Chloroethane; Ethyl chloride	75-00-3	Ethane, chloro-	8010	5
			8240	10
Chloroform	67-66-3	Methane, trichloro-	8010	0.5
			8240	5
2-Chloronaphthalene	91-58-7	Napthalene, 2-chloro-	8120	10
			8270	10
2-Chlorophenol	95-57-8	Phenol, 2-chloro-	8040	5
			8270	10
4-Chlorophenyl phenyl ether	7005-72-3	Benzene, 1-chloro-4-phenoxy	8270	10
Chloroprene	126-99-8	1,3-Butadiene,2-chloro-	8010	50
			8240	5
Chromium	(Total)	Chromium	6010	70
			7190	500
			7191	10
Chrysene	218-01-9	Chrysene	8100	200
			8270	10
Cobalt	(Total)	Cobalt	6010	70
			7200	500
			7201	10
Copper	(Total)	Copper	6010	60
			7210	200
m-Cresol	108-39-4	Phenol, 3-methyl-	8270	10
o-Cresol	95-48-7	Phenol, 2-methyl-	8270	10
p-Cresol	106-44-5	Phenol, 4-methyl-	8270	10
Cyanide	57-12-5	Cyanide	9010	40
2,4-D; 2,4-Dichlorophenoxyacetic acid	94-75-7	Acetic acid, (2,4-dichlorophenoxy)-	8150	10
4,4′-DDD	72-54-8	Benzene, 1,1′-(2,2-dichloroethylidene)bis[4-chloro-	8080	0.1
			8270	10
4,4′-DDE	72-55-9	Benzene, 1,1′-(dichloroethylidene)bis[4-chloro-	8080	0.05
			8270	10
4,4′-DDT	50-29-3	Benzene, 1,1′-(2,2,2-trichloroethylidene)bis[4-chloro-	8080	0.1
			8270	10
Diallate	2303-16-4	Carbamothioic acid, bis(1-methylethyl)-, S-(2,3-dichloro-2-propenyl) ester	8270	10
Dibenz[a,h]anthracene	53-70-3	Dibenz[a,h]anthracene	8100	200
			8270	10
Dibenzofuran	132-64-9	Dibenzofuran	8270	10
Dibromochloromethane; Chlorodibromomethane	124-48-1	Methane, dibromochloro-	8010	1
			8240	5
1,2-Dibromo-3-chloropropane; DBCP	96-12-8	Propane, 1,2-dibromo-3-chloro-	8010	100
			8240	5
			8270	10
1,2-Dibromoethane; Ethylene dibromide	106-93-4	Ethane, 1,2-dibromo-	8010	10
			8240	5

APPENDIX IX—GROUND-WATER MONITORING LIST[1]—Continued

Common name[2]	CAS RN[3]	Chemical abstracts service index name[4]	Suggested methods[5]	PQL (μg/L)[6]
Di-n-butyl phthalate	84-74-2	1,2-Benzenedicarboxylic acid, dibutyl ester	8060 8270	5 10
o-Dichlorobenzene	95-50-1	Benzene, 1,2-dichloro-	8010 8020 8120 8270	2 5 10 10
m-Dichlorobenzene	541-73-1	Benzene, 1,3-dichloro-	8010 8020 8120 8270	5 5 10 10
p-Dichlorobenzene	106-46-7	Benzene, 1,4-dichloro-	8010 8020 8120 8270	2 5 15 10
3,3′-Dichlorobenzidine	91-94-1	[1,1′-Biphenyl]-4,4′-diamine, 3,3′-dichloro-	8270	20
trans-1,4-Dichloro-2-butene	110-57-6	2-Butene, 1,4-dichloro-, (E)-	8240	5
Dichlorodifluoromethane	75-71-8	Methane, dichlorodifluoro-	8010 8240	10 5
1,1-Dichloroethane	75-34-3	Ethane, 1,1-dichloro-	8010 8240	1 5
1,2-Dichloroethane; Ethylene dichloride	107-06-2	Ethane, 1,2-dichloro-	8010 8240	0.5 5
1,1-Dichloroethylene; Vinylidene chloride	75-35-4	Ethene, 1,1-dichloro-	8010 8240	1 5
trans-1,2-Dichloroethylene	156-60-5	Ethene, 1,2-dichloro-, (E)-	8010 8240	1 5
2,4-Dichlorophenol	120-83-2	Phenol, 2,4-dichloro-	8040 8270	5 10
2,6-Dichlorophenol	87-65-0	Phenol, 2,6-dichloro-	8270	10
1,2-Dichloropropane	78-87-5	Propane, 1,2-dichloro-	8010 8240	0.5 5
cis-1,3-Dichloropropene	10061-01-5	1-Propene, 1,3-dichloro-, (Z)-	8010 8240	20 5
trans-1,3-Dichloropropene	10061-02-6	1-Propene, 1,3-dichloro-, (E)-	8010 8240	5 5
Dieldrin	60-57-1	2,7:3,6-Dimethanonaphth[2,3-b]oxirene, 3,4,5,6,9,9-hexachloro-1a,2,2a,3,6,6a,7,7a-octahydro-,(1aα,2β,2aα,3β,6β,6aα,7β,7aα)-	8080 8270	0.05 10
Diethyl phthalate	84-66-2	1,2-Benzenedicarboxylic acid, diethyl ester	8060 8270	5 10
O,O-Diethyl O-2-pyrazinyl phosphorothioate; Thionazin	297-97-2	Phosphorothioic acid, O,O-diethyl O-pyrazinyl ester	8270	10
Dimethoate	60-51-5	Phosphorodithioic acid, O,O-dimethyl S-[2-(methylamino)-2-oxoethyl] ester	8270	10
p-(Dimethylamino)azobenzene	60-11-7	Benzenamine, N,N-dimethyl-4-(phenylazo)-	8270	10
7,12-Dimethylbenz[a]anthracene	57-97-6	Benz[a]anthracene, 7,12-dimethyl-	8270	10
3,3′-Dimethylbenzidine	119-93-7	[1,1′-Biphenyl]-4,4′-diamine, 3,3′-dimethyl-	8270	10
alpha, alpha-Dimethylphenethylamine	122-09-8	Benzeneethanamine, α,α-dimethyl-	8270	10
2,4-Dimethylphenol	105-67-9	Phenol, 2,4-dimethyl-	8040 8270	5 10
Dimethyl phthalate	131-11-3	1,2-Benzenedicarboxylic acid, dimethyl ester	8060 8270	5 10
m-Dinitrobenzene	99-65-0	Benzene, 1,3-dinitro-	8270	10
4,6-Dinitro-o-cresol	534-52-1	Phenol, 2-methyl-4,6-dinitro-	8040 8270	150 50
2,4-Dinitrophenol	51-28-5	Phenol, 2,4-dinitro-	8040 8270	150 50
2,4-Dinitrotoluene	121-14-2	Benzene, 1-methyl-2,4-dinitro-	8090 8270	0.2 10
2,6-Dinitrotoluene	606-20-2	Benzene, 2-methyl-1,3-dinitro-	8090 8270	0.1 10

APPENDIX IX – GROUND-WATER MONITORING LIST[1] – Continued

Common name[2]	CAS RN[3]	Chemical abstracts service index name[4]	Suggested methods[5]	PQL (μg/L)[6]
Dinoseb; DNBP; 2-sec-Butyl-4,6-dinitrophenol	88-85-7	Phenol, 2-(1-methylpropyl)-4,6-dinitro-	8150 8270	1 10
Di-n-octyl phthalate	117-84-0	1,2-Benzenedicarboxylic acid, dioctyl ester	8060 8270	30 10
1,4-Dioxane	123-91-1	1,4-Dioxane	8015	150
Diphenylamine	122-39-4	Benzenamine, N-phenyl-	8270	10
Disulfoton	298-04-4	Phosphorodithioic acid, O,O-diethyl S-[2-(ethylthio)ethyl] ester	8140 8270	2 10
Endosulfan I	959-98-8	6,9-Methano-2,4,3-benzodioxathiepin, 6,7,8,9,10,10-hexachloro-1,5,5a,6,9,9a-hexahydro-, 3-oxide, (3α,5aβ,6α,9α,9aβ)-	8080 8250	0.1 10
Endosulfan II	33213-65-9	6,9-Methano-2,4,3-benzodioxathiepin, 6,7,8,9,10,10-hexachloro-1,5,5a,6,9,9a-hexahydro-, 3-oxide, (3α,5aα,6β,9β,9aα)-	8080	0.05
Endosulfan sulfate	1031-07-8	6,9-Methano-2,4,3-benzodioxathiepin, 6,7,8,9,10,10-hexachloro-1,5,5a,6,9,9a-hexahydro-, 3,3-dioxide	8080 8270	0.5 10
Endrin	72-20-8	2,7:3,6-Dimethanonaphth[2,3-b]oxirene, 3,4,5,6,9,9-hexachloro-1a,2,2a,3,6,6a,7,7a-octahydro-,(1aα,2β,2aβ,3α,6α,6aβ,7β,7aα)-	8080 8250	0.1 10
Endrin aldehyde	7421-93-4	1,2,4-Methenocyclopental[cd]pentalene-5-carboxaldehyde, 2,2a,3,3,4,7-hexachlorodecahydro-,(1α,2β,2aβ,4β,4aβ,5β,6aβ,6bβ,7R[8])-	8080 8270	0.2 10
Ethylbenzene	100-41-4	Benzene, ethyl-	8020 8240	2 5
Ethyl methacrylate	97-63-2	2-Propenoic acid, 2-methyl-, ethyl ester	8015 8240 8270	10 5 10
Ethyl methanesulfonate	62-50-0	Methanesulfonic acid, ethyl ester	8270	10
Famphur	52-85-7	Phosphorothioic acid, O-[4-[(dimethylamino)sulfonyl]phenyl]-O,O-dimethyl ester	8270	10
Fluoranthene	206-44-0	Fluoranthene	8100 8270	200 10
Fluorene	86-73-7	9H-Fluorene	8100 8270	200 10
Heptachlor	76-44-8	4,7-Methano-1H-indene, 1,4,5,6,7,8,8-heptachloro-3a,4,7,7a-tetrahydro-	8080 8270	0.05 10
Heptachlor epoxide	1024-57-3	2,5-Methano-2H-indeno[1,2b]oxirene, 2,3,4,5,6,7,7-heptachloro-1a,1b,5,5a,6,6a-hexahydro-, (1aα,1bβ,2α,5α,5aβ,6β,6aα)	8080 8270	1 10
Hexachlorobenzene	118-74-1	Benzene, hexachloro-	8120 8270	0.5 10
Hexachlorobutadiene	87-68-3	1,3-Butadiene, 1,1,2,3,4,4-hexachloro-	8120 8270	5 10
Hexachlorocyclopentadiene	77-47-4	1,3-Cyclopentadiene, 1,2,3,4,5,5-hexachloro-	8120 8270	5 10
Hexachloroethane	67-72-1	Ethane, hexachloro-	8120 8270	0.5 10
Hexachlorophene	70-30-4	Phenol, 2,2′-methylenebis[3,4,6-trichloro-	8270	10
Hexachloropropene	1888-71-7	1-Propene, 1,1,2,3,3,3-hexachloro-	8270	10
2-Hexanone	591-78-6	2-Hexanone	8240	50
Indeno[1,2,3-cd]pyrene	193-39-5	Indeno[1,2,3-cd]pyrene	8100 8270	200 10
Isobutyl alcohol	78-83-1	1-Propanol, 2-methyl-	8015	50
Isodrin	465-73-6	1,4,5,8-Dimethanonaphthalene, 1,2,3,4,10,10-hexachloro-1,4,4a,5,8,8a-hexahydro-(1α,4α,4aβ,5β,8β,8aβ)-	8270	10
Isophorone	78-59-1	2-Cyclohexen-1-one, 3,5,5-trimethyl	8090 8270	60 10
Isosafrole	120-58-1	1,3-Benzodioxole, 5-(1-propenyl)-	8270	10
Kepone	143-50-0	1,3,4-Metheno-2H-cyclobuta[cd]pentalen-2-one, 1,1a,3,3a,4,5,5,5a,5b,6-decachlorooctahydro-	8270	10

APPENDIX IX—GROUND-WATER MONITORING LIST[1]—Continued

Common name[2]	CAS RN[3]	Chemical abstracts service index name[4]	Suggested methods[5]	PQL (μg/L)[6]
Lead	(Total)	Lead	6010	40
			7420	1,000
			7421	10
Mercury	(Total)	Mercury	7470	2
Methacrylonitrile	126-98-7	2-Propanenitrile, 2-methyl-	8015	5
			8240	5
Methapyrilene	91-80-5	1,2-Ethanediamine, N,N-dimethyl-N′-2-pyridinyl-N′-(2-thienylmethyl)-	8270	10
Methoxychlor	72-43-5	Benzene, 1,1′-(2,2,2-trichloroethylidene)bis[4-methoxy-	8080	2
			8270	10
Methyl bromide; Bromomethane	74-83-9	Methane, bromo-	8010	20
			8240	10
Methyl chloride: Chloromethane	74-87-3	Methane, chloro-	8010	1
			8240	10
3-Methylcholanthrene	56-49-5	Benz[j]aceanthrylene, 1,2-dihydro-3-methyl-	8270	10
Methylene bromide; Dibromomethane	74-95-3	Methane, dibromo-	8010	15
			8240	5
Methylene chloride; Dichloromethane	75-09-2	Methane, dichloro-	8010	5
			8240	5
Methyl ethyl ketone; MEK	78-93-3	2-Butanone	8015	10
			8240	100
Methyl iodide; Iodomethane	74-88-4	Methane, iodo-	8010	40
			8240	5
Methyl methacrylate	80-62-6	2-Propenoic acid, 2-methyl-, methyl ester	8015	2
			8240	5
Methyl methanesulfonate	66-27-3	Methanesulfonic acid, methyl ester	8270	10
2-Methylnaphthalene	91-57-6	Naphthalene, 2-methyl-	8270	10
Methyl parathion; Parathion methyl	298-00-0	Phosphorothioic acid, O,O-dimethyl O-(4-nitrophenyl) ester	8140	0.5
			8270	10
4-Methyl-2-pentanone; Methyl isobutyl ketone	108-10-1	2-Pentanone, 4-methyl-	8015	5
			8240	50
Naphthalene	91-20-3	Naphthalene	8100	200
			8270	10
1,4-Naphthoquinone	130-15-4	1,4-Naphthalenedione	8270	10
1-Naphthylamine	134-32-7	1-Naphthalenamine	8270	10
2-Naphthylamine	91-59-8	2-Naphthalenamine	8270	10
Nickel	(Total)	Nickel	6010	50
			7520	400
o-Nitroaniline	88-74-4	Benzenamine, 2-nitro-	8270	50
m-Nitroaniline	99-09-2	Benzenamine, 3-nitro-	8270	50
p-Nitroaniline	100-01-6	Benzenamine, 4-nitro-	8270	50
Nitrobenzene	98-95-3	Benzene, nitro-	8090	40
			8270	10
o-Nitrophenol	88-75-5	Phenol, 2-nitro	8040	5
			8270	10
p-Nitrophenol	100-02-7	Phenol, 4-nitro-	8040	10
			8270	50
4-Nitroquinoline-1-oxide	56-57-5	Quinoline, 4-nitro-, 1-oxide	8270	10
N-Nitrosodi-n-butylamine	924-16-3	1-Butanamine, N-butyl-N-nitroso-	8270	10
N-Nitrosodiethylamine	55-18-5	Ethanamine, N-ethyl-N-nitroso-	8270	10
N-Nitrosodimethylamine	62-75-9	Methamine, N-methyl-N-nitroso-	8270	10
N-Nitrosodiphenylamine	86-30-6	Benzenamine, N-nitroso-N-phenyl-	8270	10
N-Nitrosodipropylamine; Di-n-propyl-nitrosamine	621-64-7	1-Propanamine, N-nitroso-N-propyl	8270	10
N-Nitrosomethylethylamine	10595-95-6	Ethanamine, N-methyl-N-nitroso-	8270	10
N-Nitrosomorpholine	59-89-2	Morpholine, N-nitroso-	8270	10
N-Nitrosopiperidine	100-75-4	Piperidine, 1-nitroso-	8270	10
N-Nitrosopyrrolidine	930-55-2	Pyrrolidine, 1-nitroso-	8270	10
5-Nitro-o-toluidine	99-55-8	Benzenamine, 2-methyl-5-nitro-	8270	10
Parathion	56-38-2	Phosphorothioic acid, O,O-diethyl-O-,(4-nitrophenyl) ester	8270	10

APPENDIX IX—GROUND-WATER MONITORING LIST[1]—Continued

Common name[2]	CAS RN[3]	Chemical abstracts service index name[4]	Suggested methods[5]	PQL (μg/L)[6]
Polychlorinated biphenyls; PCBs	Note 7	1,1′-Biphenyl, chloroderivatives	8080 8250	50 100
Polychlorinated dibenzo-p-dioxins; PCDDs	Note 8	Dibenzo[b,e][1,4]dioxin, chloro derivatives	8280	0.01
Polychlorinated dibenzofurans; PCDFs	Note 9	Dibenzofuran, chloro derivatives	8280	0.01
Pentachlorobenzene	608-93-5	Benzene, pentachloro-	8270	10
Pentachloroethane	76-01-7	Ethane, pentachloro-	8240 8270	5 10
Pentachloronitrobenzene	82-68-8	Benzene, pentachloronitro-	8270	10
Pentachlorophenol	87-86-5	Phenol, pentachloro-	8040 8270	5 50
Phenacetin	62-44-2	Acetamide, N-(4-ethoxyphenyl)-	8270	10
Phenanthrene	85-01-8	Phenanthrene	8100 8270	200 10
Phenol	108-95-2	Phenol	8040 8270	1 10
p-Phenylenediamine	106-50-3	1,4-Benzenediamine	8270	10
Phorate	298-02-2	Phosphorodithioic acid, O,O-diethyl S-[(ethylthio)methyl] ester	8140 8270	2 10
2-Picoline	109-06-8	Pyridine, 2-methyl-	8240 8270	5 10
Pronamide	23950-58-5	Benzamide, 3,5-Dichloro-N-(1,1-dimethyl-2-propynyl)-	8270	10
Propionitrile; Ethyl cyanide	107-12-0	Propanenitrile	8015 8240	60 5
Pyrene	129-00-0	Pyrene	8100 8270	200 10
Pyridine	110-86-1	Pyridine	8240 8270	5 10
Safrole	94-59-7	1,3-Benzodioxole, 5-(2-propenyl)-	8270	10
Selenium	(Total)	Selenium	6010 7740 7741	750 20 20
Silver	(Total)	Silver	6010 7760	70 100
Silvex; 2,4,5-TP	93-72-1	Propanoic acid, 2-(2,4,5-trichlorophenoxy)-	8150	2
Styrene	100-42-5	Benzene, ethenyl-	8020 8240	1 5
Sulfide	18496-25-8	Sulfide	9030	10,000
2,4,5-T; 2,4,5-Trichlorophenoxyacetic acid	93-76-5	Acetic acid, (2,4,5-trichlorophenoxy)-	8150	2
2,3,7,8-TCDD; 2,3,7,8-Tetrachloro-dibenzo-p-dioxin	1746-01-6	Dibenxo[b,e][1,4]dioxin, 2,3,7,8-tetrachloro-	8280	0.005
1,2,4,5-Tetrachlorobenzene	95-94-3	Benzene, 1,2,4,5-tetrachloro-	8270	10
1,1,1,2-Tetrachloroethane	630-20-6	Ethane, 1,1,1,2-tetrachloro-	8010 8240	5 5
1,1,2,2-Tetrachloroethane	79-34-5	Ethane, 1,1,2,2-tetrachloro-	8010 8240	0.5 5
Tetrachloroethylene; Perchloroethylene; Tetrachlorothene	127-18-4	Ethene, tetrachloro-	8010 8240	0.5 5
2,3,4,6-Tetrachlorophenol	58-90-2	Phenol, 2,3,4,6-tetrachloro-	8270	10
Tetraethyl dithiopyrophosphate; Sulfotepp	3689-24-5	Thiodiphosphoric acid, $([(HO)_2P(S)]_2O)$, tetraethyl ester	8270	10
Thallium	(Total)	Thallium	6010 7840 7841	400 1,000 10
Tin	(Total)	Tin	7870	8,000
Toluene	108-88-3	Benzene, methyl-	8020 8240	2 5
o-Toluidine	95-53-4	Benzenamine, 2-methyl-	8270	10
Toxaphene	8001-35-2	Toxaphene	8080 8250	2 10

APPENDIX IX – GROUND-WATER MONITORING LIST[1] – Continued

Common name[2]	CAS RN[3]	Chemical abstracts service index name[4]	Suggested methods[5]	PQL (μg/L)[6]
1,2,4-Trichlorobenzene	120-82-1	Benzene, 1,2,4-trichloro-	8270	10
1,1,1-Trichloroethane; Methylchloroform	71-55-6	Ethane, 1,1,1-trichloro-	8240	5
1,1,2-Trichloroethane	79-00-5	Ethane, 1,1,2-trichloro-	8010	0.2
			8240	5
Trichloroethylene; Trichloroethene	79-01-6	Ethene, trichloro	8010	1
			8240	5
Trichlorofluoromethane	75-69-4	Methane, trichlorofluoro-	8010	10
			8240	5
2,4,5-Trichlorophenol	95-95-4	Phenol, 2,4,5-trichloro-	8270	10
2,4,6-Trichlorophenol	88-06-2	Phenol, 2,4,6-trichloro-	8040	5
			8270	10
1,2,3-Trichloropropane	96-18-4	Propane, 1,2,3-trichloro-	8010	10
			8240	5
O,O,O-Triethyl phosphorothioate	126-68-1	Phosphorothioic acid, O,O,O-triethyl ester	8270	10
sym-Trinitrobenzene	99-35-4	Benzene, 1,3,5-trinitro-	8270	10
Vanadium	(Total)	Vanadium	6010	80
			7910	2,000
			7911	40
Vinyl acetate	108-05-4	Acetic acid, ethenyl ester	8240	5
Vinyl chloride	75-01-4	Ethene, chloro-	8010	2
			8240	10
Xylene (total)	1330-20-7	Benzene, dimethyl-	8020	5
			8240	5
Zinc	(Total)	Zinc	6010	20
			7950	50

[1] The regulatory requirements pertain only to the list of substances; the right hand columns (Methods and PQL) are given for informational purposes only. See also footnotes 5 and 6.

[2] Common names are those widely used in government regulations, scientific publications, and commerce; synonyms exist for many chemicals.

[3] Chemical Abstracts Service registry number. Where "Total" is entered, all species in the ground water that contain this element are included.

[4] CAS index names are those used in the 9th Cumulative Index.

[5] Suggested Methods refer to analytical procedure numbers used in EPA Report SW–846 "Test Methods for Evaluating Solid Waste", third edition, November 1986. Analytical details can be found in SW–846 and in documentation on file at the agency. CAUTION: The methods listed are representative SW–846 procedures and may not always be the most suitable method(s) for monitoring an analyte under the regulations.

[6] Practical Quantitation Limits (PQLs) are the lowest concentrations in ground waters that can be reliably determined within specified limits of precision and accuracy by the indicated methods under routine laboratory operating conditions. The PQLs listed are generally stated to one significant figure. CAUTION: The PQL values in many cases are based only on a general estimate for the method and not on a determination for individual compounds; PQLs are not a part of the regulation.

[7] Polychlorinated biphenyls (CAS RN 1336–36–3); this category contains congener chemicals, including constituents of Aroclor-1016 (CAS RN 12674–11–2); Aroclor-1221 (CAS RN 11104–28–2), Aroclor-1232 (CAS RN 11141–16–5), Aroclor-1242 (CAS RN 53469–21–9), Aroclor-1248 (CAS RN 12672–29–6), Aroclor-1254 (CAS RN 11097–69–1), and Aroclor-1260 (CAS RN 11096–82–5). The PQL shown is an average value for PCB congeners.

[8] This category contains congener chemicals, including tetrachlorodibenzo-p-dioxins (see also 2,3,7,8-TCDD), pentachlorodibenzo-p-dioxins, and hexachlorodibenzo-p-dioxins. The PQL shown is an average value for PCDD congeners.

[9] This category contains congener chemicals, including tetrachlorodibenzofurans, pentachlorodibenzofurans, and hexachlorodibenzofurans. The PQL shown is an average value for PCDF congeners.

[52 FR 25946, July 9, 1987]

For data sets with more than 30 observations, the parametric analysis of variance performed on the rank values is a good approximation to the Kruskal-Wallis test (Quade, 1966). If the user has access to SAS, the PROC RANK procedure is used to obtain the ranks of the data. The analysis of variance procedure detailed in Section 5.2.1 is then performed on the ranks. Contrasts are tested as in the parametric analysis of variance.

INTERPRETATION

The Kruskal-Wallis test statistic is compared to the tabulated critical value from the chi-squared distribution. If the test statistic does not exceed the tabulated value, there is no statistically significant evidence of contamination and the analysis would stop and report this finding. If the test statistic exceeds the tabulated value, there is significant evidence that the hypothesis of no differences in compliance concentrations from the background level is not true. Consequently, if the test statistic exceeds the critical value, one concludes that there is significant evidence of contamination. One then proceeds to investigate where the differences lie, that is, which wells are indicating contamination.

The multiple comparisons procedure described in steps 5 and 6 compares each compliance well to the background well. This determines which compliance wells show statistically significant evidence of contamination at an experimentwise error rate of 5 percent. In many cases, inspection of the mean or median concentrations will be sufficient to indicate where the problem lies.

5.3 TOLERANCE INTERVALS BASED ON THE NORMAL DISTRIBUTION

An alternate approach to analysis of variance to determine whether there is statistically significant evidence of contamination is to use tolerance intervals. A tolerance interval is constructed from the data on (uncontaminated) background wells. The concentrations from compliance wells are then compared with the tolerance interval. With the exception of pH, if the compliance concentrations do not fall in the tolerance interval, this provides statistically significant evidence of contamination.

Tolerance intervals are most appropriate for use at facilities that do not exhibit high degrees of spatial variation between background wells and compliance wells. Facilities that overlie extensive, homogeneous geologic deposits (for example, thick, homogeneous lacustrine clays) that do not naturally display hydrogeochemical variations may be suitable for this statistical method of analysis.

A tolerance interval establishes a concentration range that is constructed to contain a specified proportion (P%) of the population with a specified confidence coefficient, Y. The proportion of the population included, P, is referred to as the coverage. The probability with which the tolerance interval includes the proportion P% of the population is referred to as the tolerance coefficient.

A coverage of 95% is recommended. If this is used, random observations from the same distribution as the background well data would exceed the upper

tolerance limit less than 5% of the time. Similarly, a tolerance coefficient of 95% is recommended. This means that one has a confidence level of 95% that the upper 95% tolerance limit will contain at least 95% of the distribution of observations from background well data. These values were chosen to be consistent with the performance standards described in Section 2. The use of these values corresponds to the selection of α of 5% in the multiple well testing situation.

The procedure can be applied with as few as three observations from the background distribution. However, doing so would result in a large upper tolerance limit. A sample size of eight or more results is an adequate tolerance interval. The minimum sampling schedule called for in the regulations would result in at least four observations from each background well. Only if a single background well is sampled at a single point in time is the sample size so small as to make use of the procedure questionable.

Tolerance intervals can be constructed assuming that the data or the transformed data are normally distributed. Tolerance intervals can also be constructed assuming other distributions. It is also possible to construct nonparametric tolerance intervals using only the assumption that the data came from some continuous population. However, the nonparametric tolerance intervals require such a large number of observations to provide a reasonable coverage and tolerance coefficient that they are impractical in this application.

The range of the concentration data in the background well samples should be considered in determining whether the tolerance interval approach should be used, and if so, what distribution is appropriate. The background well concentration data should be inspected for outliers and tests of normality applied before selecting the tolerance interval approach. Tests of normality were presented in Section 4.2. Note that in this case, the test of normality would be applied to the background well data that are used to construct the tolerance interval. These data should all be from the same normal distribution.

In this application, unless pH is being monitored, a one-sided tolerance interval or an upper tolerance limit is desired, since contamination is indicated by large concentrations of the hazardous constituents monitored. Thus, for concentrations, the appropriate tolerance interval is (0, TL), with the comparison of importance being the larger limit, TL.

PURPOSE

The purpose of the tolerance interval approach is to define a concentration range from background well data, within which a large proportion of the monitoring observations should fall with high probability. Once this is done, data from compliance wells can be checked for evidence of contamination by simply determining whether they fall in the tolerance interval. If they do not, this is evidence of contamination.

In this case the data are assumed to be approximately normally distributed. Section 4.2 provided methods to check for normality. If the data are

not normal, take the natural logarithm of the data and see if the transformed data are approximately normal. If so, this method can be used on the logarithms of the data. Otherwise, seek the assistance of a professional statistician.

PROCEDURE

Step 1. Calculate the mean, $\bar{X}$, and the standard deviation, S, from the background well data.

Step 2. Construct the one-sided upper tolerance limit as

$$TL = \bar{X} + K\,S,$$

where K is the one-sided normal tolerance factor found in Table 5, Appendix B.

Step 3. Compare each observation from compliance wells to the tolerance limit found in Step 2. If any observation exceeds the tolerance limit, that is statistically significant evidence that the well is contaminated. Note that if the tolerance interval was constructed on the logarithms of the original background observations, the logarithms of the compliance well observations should be compared to the tolerance limit. Alternatively the tolerance limit may be transferred to the original data scale by taking the antilogarithm.

REFERENCE

Lieberman, Gerald J. 1958. "Tables for One-sided Statistical Tolerance Limits." *Industrial Quality Control*. Vol. XIV, No. 10.

EXAMPLE

Table 5-5 contains example data that represent lead concentration levels in parts per million in water samples at a hypothetical facility. The background well data are in columns 1 and 2, while the other four columns represent compliance well data.

Step 1. The mean and standard deviation of the n = 8 observations have been calculated for the background well. The mean is 51.4 and the standard deviation is 16.3.

Step 2. The tolerance factor for a one-sided normal tolerance interval is found from Table 5, Appendix B as 3.188. This is for 95% coverage with probability 95% and for n = 8. The upper tolerance limit is then calculated as $51.4 + (3.188)(16.3) = 103.4$.

Step 3. The tolerance limit of 103.3 is compared with the compliance well data. Any value that exceeds the tolerance limit indicates statistically significant evidence of contamination. Two observations from Well 1, two observations from Well 3, and all four observations from Well 4 exceed the tolerance limit. Thus there is statistically significant evidence of contamination at Wells 1, 3, and 4.

TABLE 5-5. EXAMPLE DATA FOR NORMAL TOLERANCE INTERVAL

Lead concentrations (ppm)

Date	Background well A	Background well B	Compliance wells Well 1	Well 2	Well 3	Well 4
Jan 1	58.0	46.1	273.1*	34.1	49.9	225.9*
Feb 1	54.1	76.7	170.7*	93.7	73.0	183.1*
Mar 1	30.0	32.1	32.1	70.8	244.7*	198.3*
Apr 1	46.1	68.0	53.0	83.1	202.4*	160.8*

n = 8
Mean = 51.4
SD = 16.3

The upper 95% coverage tolerance limit with tolerance coefficient of 95% is
51.4 + (3.188)(16.3) = 103.4

* Indicates contamination

INTERPRETATION

A tolerance limit with 95% coverage gives an upper bound below which 95% of the observations of the distribution should fall. The tolerance coefficient used here is 95%, implying that at least 95% of the observations should fall below the tolerance limit with probability 95%, if the compliance well data come from the same distribution as the background data. In other words, in this example, we are 95% certain that 95% of the background lead concentrations are below 104 ppm. If observations exceed the tolerance limit, this is evidence that the compliance well data are not from the same distribution, but rather are from a distribution with higher concentrations. This is interpreted as statistically significant evidence of contamination.

5.4 PREDICTION INTERVALS

A prediction interval is a statistical interval calculated to include one or more future observations from the same population with a specified confidence. This approach is algebraically equivalent to the average replicate (AR) test that is presented in the Technical Enforcement Guidance Document (TEGD), September 1986. In ground-water monitoring, a prediction interval approach may be used to make comparisons between background and compliance well data. This method of analysis is similar to that for calculating a tolerance limit, and familiarity with prediction intervals or personal preference would be the only reason for selecting them over the method for tolerance limits. The concentrations of a hazardous constituent in the background wells are used to establish an interval within which K future observations from the same population are expected to lie with a specified confidence. Then each of K future observations of compliance well concentrations is compared to the prediction interval. The interval is constructed to contain all of K future

WELL ABANDONMENT PROCEDURES

(Based on ARM 36.21.810, 16.14.713 [proposed], and AWWA standards.)

The need for sealing wells:

All abandoned wells shall be properly sealed to prevent physical hazards, eliminate the potential for surface water percolation through the well bore or along the outside of the casing to the water table, and prevent contamination of ground water.

The method for sealing wells:

Abandoned wells or borings shall be completely sealed with a bentonite clay grout, neat cement grout, or concrete that is continuous and physically and chemically stable.

a) If the casing and screen are left in place, the casing and screen shall be perforated to ensure proper sealing. The well bore shall be grouted from the bottom up using a pump and hose or tremie pipe. Metal casings shall be cut off three feet below the ground surface and the last three feet backfilled with naturally occurring soil.

b) If the casing and screen are removed, the well bore shall be filled with grout as the casing and screen are removed. The last three feet shall be backfilled with naturally occurring soil.

Records of well abandonment:

Complete and accurate records of well abandonment procedures shall be maintained. This will provide information for future reference and demonstrate to interested regulatory agencies that the well was properly sealed. Include the following information:

a) Well identification number and location.

b) Depths sealed.

c) Quantity and type of sealing material used.

d) Any changes made to the well during the abandonment procedure (i.e., removal of casing, perforation of casing, depth of casing cut-off, etc.).

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

DRAFT PERMIT

PURSUANT TO THE HAZARDOUS AND SOLID WASTE AMENDMENTS OF 1984

FARMERS UNION CENTRAL EXCHANGE/CENEX REFINERY

LAUREL, MONTANA

EPA I.D. NUMBER MTD006238083

EPA REGION VIII
999 18th STREET
DENVER PLACE SUITE 500
DENVER,CO. 80202-2405

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
DRAFT PERMIT
UNDER THE HAZARDOUS AND SOLID WASTE
AMENDMENTS OF 1984

Permittee: Farmers Union Central Exchange/Cenex

Facility Name: Cenex Refinery

Facility Location: Laurel, Montana

EPA Identification Number: MTD006238083

Effective Date:

Expiration Date: (Ten years after effective date)

Pursuant to the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act of 1976, as amended (42 U.S.C. §6901 et seq., commonly known as RCRA) and regulations promulgated thereunder by the U.S. Environmental Protection Agency (EPA) (codified and to be codified in Title 40 of the Code of Federal Regulations), a permit is issued to the Farmers Union Central Exchange/Cenex (hereafter "Cenex"), which owns and operates a hazardous waste facility located in Laurel, Montana (hereafter "Facility").

This Permit, in conjunction with the Hazardous Waste Management Permit issued by the State of Montana, constitutes the RCRA permit for this facility. Pursuant to this Permit, the Permittee shall be required to investigate any releases of hazardous waste or hazardous constituents from solid waste management units at the facility regardless of the time at which waste was placed in such unit and to take appropriate corrective action for any releases. The Permit also requires the Permittee to comply with all land disposal restriction, volatile organic air emission, toxicity characteristic regulations and petroleum refinery waste listings applicable to this facility and to certify annually that on-site generation of hazardous waste is minimized to the extent practicable.

The Permittee must comply with all terms and conditions of this Permit. This Permit consists of the conditions contained herein (including those in any attachments) and applicable regulations contained in 40 CFR Parts 260 through 264, 266, 268, 270, and 124 as specified in the Permit and statutory requirements of RCRA, as amended by the Hazardous and Solid Waste Amendments (HSWA) of 1984, P.L. 98-616. Nothing in this Permit shall preclude EPA from reviewing and modifying the Permit at any time during its term in accordance with 40 CFR §270.41. All attachments specifically referred to herein are hereby incorporated into this permit by reference as if fully set forth herein.

This Permit is based on the premise that the information and reports submitted previously and subsequent to issuance of this permit by the Permittee are accurate. Any inaccuracies found in this information may be grounds for termination or modification of this permit in accordance with 40 CFR §270.41, §270.42, and §270.43, and potential enforcement action. The Permittee must inform EPA of any deviation from or changes in the information in the application which would affect the Permittee's ability to comply with the applicable regulations or permit conditions.

The authority to perform all actions necessary to issue, modify, enforce, or revoke this Permit has been delegated by the EPA Regional Administrator to the EPA Hazardous Waste Management Division Director (hereinafter "Director").

This Permit is effective as of _____, and shall remain in effect until _____, unless revoked and reissued, or terminated under 40 CFR §270.41 and §270.43 or continued in accordance with 40 CFR §270.51(a). All obligations for performance of Corrective Action are in effect until deemed complete by the Director. When the Montana Department of Health and Environmental Sciences (MDHES) is delegated the authority for portions of this permit, it shall assume the administration of those portions.

If any conditions of this permit are appealed in accordance with 40 CFR §124.19, the effective date of the conditions determined to be stayed in accordance with 40 CFR §124.16 shall be determined by final agency action as specified under 40 CFR §124.19.

_____ _____

Robert L. Duprey, Director
Hazardous Waste Management Division
Environmental Protection Agency -
Region VIII

Date

TABLE OF CONTENTS

		40 CFR Section	Page
Cover Page	Permit Authority Permit Duration	Part 124 Part 260 Part 261 Part 264 Part 270	
Part I	STANDARD CONDITIONS		
I.A.	Effect of Permit	270.4 270.30(g)	4
I.B.	Permit Actions	270.30(f) 270.41 270.42 270.43	4
I.C.	Severability	124.16	4
I.D.	Duties and Requirements		4
I.D.1.	Duty to Comply	270.30(a)	4
I.D.2.	Duty to Reapply	270.10(h) 270.30(b)	5
I.D.3.	Continuation of Expired Permits	270.51	5
I.D.4.	Need to Halt or Reduce Activity	270.30(c)	5
I.D.5.	Duty to Mitigate	270.30(d)	5
I.D.6.	Proper Operation and Maintenance	270.30(e)	5
I.D.7.	Duty to Provide Information	264.74(a) 270.30(h)	6
I.D.8.	Inspection and Entry	270.30(i)	6
I.D.9.	Monitoring and Records	264.74(b) 270.30(j)	6
I.D.10.	Reporting Planned Changes	270.30(l)(1)&(2)	7

	40 CFR Section	Page
I.D.11. Anticipated Noncompliance	270.30(l)(2)	7
I.D.12. Transfer of Permit	264.12(c) 270.30(l)(3) 270.40	8
I.D.13. Compliance Schedules	270.33	8
I.D.14. Twenty-four Hour Reporting	270.30(l)(6)	8
I.D.15. Other Noncompliance	270.30(l)(10)	9
I.D.16. Other Information	270.30(l)(11)	9
I.D.17. Areas of Concern (AOCs)	270.32(b)(2)	9
I.E. Signatory Requirement	270.11 270.30(k)	9
I.F. Confidential Information	270.12 Part 2	10
I.G. Definitions	Part 124 Part 260 Part 261 Part 264 Part 270	10
Part II CORRECTIVE ACTION	RCRA 3005(c) RCRA 3004(u)	
II.A. Applicability	264.101(a) 270.32(b)(2)	12
II.B. Notification and Assessment of Newly Identified SWMUs and AOCs	270.14(d) 270.32(c)	12
II.C. Notification Requirements for Newly Discovered Releases at SWMUs and AOCs	270.14(d) 270.32(c)	13
II.D. RCRA Facility Investigation	264.101	13
II.E. Interim Measures	264.101	15

	40 CFR Section	Page
II.F. Corrective Measures Study	264.101	17
II.G. Remedy Approval and Permit Modification	270.41 270.42 264.101(b)	18
II.H. Modification of Schedule of Compliance	264.101(b) 270.41	19
II.I. Imminent Hazard	270.30(l)(6)	19
II.J. Plan and Report Requirements	270.11 270.30(k)	19
II.K. Financial Responsibility for RFI, CMS and/or Interim Measure	RCRA 3004(a)(6) 264.101	20
Part III WASTE MINIMIZATION	264.73(b)(9) RCRA 3005(h)	23
Part IV LAND DISPOSAL RESTRICTIONS	Part 268	23
Part V ORGANIC AIR EMISSIONS	264, Subpart AA	24
Part VI TOXICITY CHARACTERISTIC	261.24	24
Part VII PETROLEUM REFINERY LISTINGS	261.31	24

APPENDIX A	Summary of Solid Waste Management Units and Areas of Concern	A-1
APPENDIX B	RCRA Facility Investigation (RFI) Workplan Outline	B-1
APPENDIX C	Corrective Measures Plan (CMS) Outline	C-1
APPENDIX D	Compliance Schedule	D-1
APPENDIX E	Waste Minimization Certification	E-1

PART I - STANDARD CONDITIONS

I.A. EFFECT OF PERMIT

Compliance with this permit constitutes compliance, for purposes of enforcement, with Subtitle C of RCRA except for those requirements not included in the permit which become effective by statute, which are promulgated, or those which restrict placement of hazardous waste in or on the land. Issuance of this permit does not convey property rights of any sort or any exclusive privilege; nor does it authorize any injury to persons or property, any invasion of other private rights, or any infringement of state or local law or regulations. Compliance with the terms of this permit does not constitute a defense to any order issued or any action brought under Sections 3008(a), 3008(h), 3007, 3013, 3004(v), 3008(c) or Section 7003 of RCRA, Sections 104, 106(a), 106(e), or 107 of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (42 U.S.C. 9601 et seq., commonly known as CERCLA), or any other law providing for protection of public health or the environment.

I.B. PERMIT ACTIONS

This permit may be modified, revoked and reissued, or terminated for cause as specified in 40 CFR §§270.41, 270.42, and 270.43 except for the Compliance Schedule (Appendix D) which shall be modified in accordance with Condition II.H. of this permit. The filing of a request for a permit modification, revocation and reissuance, or termination, or the notification of planned changes or anticipated noncompliance on the part of the Permittee does not stay the applicability or enforceability of any permit condition.

I.C. SEVERABILITY

The provisions of this permit are severable, as specified in 40 CFR §124.16 and if any provision of this permit or the application of any provision of this permit to any circumstance is held invalid, the application of such provision to other circumstances and the remainder of this permit shall not be affected thereby.

I.D. DUTIES AND REQUIREMENTS

I.D.1. Duty to Comply

The Permittee shall comply with all conditions of this permit, except to the extent and for the duration such noncompliance is authorized by an emergency permit. Any

permit noncompliance, other than noncompliance authorized by an emergency permit, constitutes a violation of RCRA and is grounds for enforcement action, permit termination, revocation and reissuance, modification, or denial of a permit renewal application.

I.D.2. Duty to Reapply

If the Permittee will continue an activity allowed or required by this permit after the expiration date of this permit, the Permittee shall submit a complete application for a new permit at least one hundred eighty (180) calendar days before this permit expires, unless permission for a later date has been granted by the Director.

I.D.3. Continuation of Expired Permits

When EPA is the permit issuing authority, this permit and all conditions therein will remain in effect beyond the permit's expiration date if the Permittee has submitted a timely, complete application and through no fault of the Permittee, the Director has not issued a new permit.

I.D.4. Need to Halt or Reduce Activity Not a Defense

It shall not be a defense for the Permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

I.D.5. Duty to Mitigate

In the event of noncompliance with the permit, the Permittee shall take all reasonable steps to minimize releases of hazardous waste or hazardous constituents to the environment, and shall carry out such measures as are reasonable to prevent significant adverse effects on human health or the environment.

I.D.6. Proper Operation and Maintenance

The Permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the Permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance includes effective performance, adequate funding, adequate operator staffing and training, and adequate laboratory and process controls, including appropriate quality assurance procedures. This provision requires the operation of backup or auxiliary facilities

or similar systems only when necessary to achieve compliance with the conditions of the permit.

I.D.7. Duty to Provide Information

The Permittee shall furnish to the Director, within a reasonable time, any relevant information which he/she may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit. The Permittee shall also furnish to the Director, upon request, copies of records required to be kept by this permit.

I.D.8. Inspection and Entry

The Permittee shall allow the Director, or authorized representatives, upon the presentation of credentials and other documents as may be required by law to:

I.D.8.a. Enter at reasonable times upon the Permittee's premises where a regulated activity is located or conducted, or where records must be kept under the conditions of this permit;

I.D.8.b. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;

I.D.8.c. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated, or required under this permit; and

I.D.8.d. Sample or monitor at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by RCRA, any substances or parameters at any location.

I.D.9. Monitoring and Records

I.D.9.a. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity. The method used to obtain a representative sample to be analyzed must be the appropriate method from Appendix I of 40 CFR Part 261 or an equivalent method approved by the Director. Laboratory methods must be those specified in the most recent edition of Test Methods for Evaluating Solid Waste: Physical/Chemical Methods, SW-846, or an equivalent method approved by the Director.

I.D.9.b. The Permittee shall retain at the facility, or other appropriate location as provided for under 40 CFR Part 264, records of all monitoring information required under the terms of this permit, including all calibration and

maintenance records, records of all data used to prepare documents required by this permit, copies of all reports and records required by this permit, the certification required by 40 CFR §264.73(b)(9), and records of all data used to complete the application for this permit for a period of at least three years from the date of the sample, measurement, report, certification or application, or until corrective action is completed, whichever date is later. As a generator of hazardous waste, the Permittee shall retain on-site a copy of all notices, certifications, demonstrations, waste analysis data, and other documentation produced pursuant to 40 CFR Part 268 for at least five years from the date that the waste which is the subject of such documentation was last sent to on-site or off-site treatment, storage, or disposal, or until corrective action is completed, whichever date is later. These periods may be extended by request of the Director at any time and are automatically extended during the course of any unresolved enforcement action regarding this facility.

I.D.9.c. Records of monitoring information shall specify:

i. The dates, exact place, and times of sampling, or measurements;

ii. The individuals who performed the sampling or measurements;

iii. The dates analyses were performed;

iv. The individuals who performed the analyses;

v. The analytical techniques or methods used; and

vi. The results of such analyses.

I.D.10. Reporting Planned Changes

The Permittee shall give notice to the Director as soon as possible of any planned physical alterations or additions to the permitted facility. This would apply to all contiguous land, structures, other appurtenances and improvements on the land, used for the treatment, storage or disposal of hazardous waste.

I.D.11. Anticipated Noncompliance

The Permittee shall give advance notice to the Director of any planned changes in the permitted facility or activity which may result in noncompliance with the requirements of this permit.

I.D.12. Transfer of Permits

This permit may be transferred to a new owner or operator only after notice to the Director and only if it is modified or revoked and reissued pursuant to 40 CFR §270.40(b) or §270.41(b)(2) to identify the new permittee and incorporate such other requirements as may be necessary under the appropriate Act. Before transferring ownership or operation of the facility during its operating life, or of a disposal facility during the post-closure care period, the Permittee shall notify the new owner or operator in writing of the requirements of 40 CFR Parts 264 and 270, HSWA and this permit.

I.D.13. Compliance Schedules

Written notification of compliance or noncompliance with any item identified in the compliance schedule of this permit shall be submitted according to each schedule date. If the Permittee does not notify the Director within fourteen (14) calendar days of its compliance or noncompliance with the schedule, the Permittee shall be subject to an enforcement action. Submittal of a required item according to the schedule constitutes notification of compliance.

I.D.14. Twenty-four Hour Reporting

I.D.14.a. The Permittee shall report any noncompliance which may endanger human health or the environment. Any such information shall be reported orally to the Director within 24 hours from the time the Permittee becomes aware of the circumstances. This report shall include:

i. Information concerning the release of any hazardous waste or hazardous constituents which may endanger public drinking water supplies.

ii. Information concerning the release or discharge of any hazardous waste or hazardous constituents, or of a fire or explosion at the facility, which could threaten the environment or human health outside the facility.

I.D.14.b. The description of the occurrence and its cause required in Condition I.A.14.a. shall include:

i. Name, address, and telephone number of the owner or operator;

ii. Name, address, and telephone number of the facility;

iii. Date, time, and type of incident;

iv. Name and quantity of materials involved;

v. The extent of injuries, if any;

vi. An assessment of actual or potential hazard to the environment and human health outside the facility; and

vii. Estimated quantity and disposition of recovered material that resulted from the incident.

I.D.14.c. A written report shall also be provided to the Director within five (5) calendar days of the time the Permittee becomes aware of the circumstances. The written report shall contain the information specified under Conditions I.D.14.a and b; a description of the noncompliance and its cause; the periods of noncompliance (including exact dates and times); whether the noncompliance has been corrected; and if not, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent recurrence of the noncompliance.

I.D.15. Other Noncompliance

The Permittee shall report all other instances of noncompliance not otherwise required to be reported above, at the time written reports as required by this permit are submitted. The reports shall contain the information listed in Condition I.D.14 as appropriate.

I.D.16. Other Information

Whenever the Permittee becomes aware that it failed to submit any relevant facts or submitted incorrect information in any document(s) submitted to the Director, the Permittee shall promptly submit such facts or information.

I.D.17. Areas of Concern (AOCs)

Areas of concern listed in Appendix A-1, and any additional AOCs identified in the future, shall receive the same level of investigation and remediation as that required by regulation and statute for solid waste management units.

I.E. SIGNATORY REQUIREMENT

All applications, reports, or information submitted to the

Director shall be signed and certified in accordance with 40 CFR §270.11.

I.F. CONFIDENTIAL INFORMATION

The Permittee may claim confidential any information required to be submitted by this permit in accordance with 40 CFR §270.12.

I.G. DEFINITIONS

For purposes of this permit, terms used herein shall have the same meaning as those in RCRA and 40 CFR Parts 124, 260, 261, 264, and 270, unless this permit specifically provides otherwise. Where terms are not defined in the regulation, the permit, or EPA guidelines or publications, the meaning associated with such terms shall be defined by a standard dictionary reference or the generally accepted scientific or industrial meaning of the term.

I.G.1. "Area of concern" (AOC) for purposes of this permit includes any area at a facility having a probable release of a hazardous waste or hazardous constituent which may or may not be from a solid waste management unit and is determined by the Director to pose a current or potential threat to human health or the environment. Areas of concern identified in Appendix A-1, and any additional AOCs identified in the future, shall receive the same level of investigation and remediation as that of SWMUs.

I.G.2. "Corrective measures" for purposes of this permit, include all corrective actions necessary to protect human health and the environment for all releases of hazardous waste or hazardous constituents from any solid waste management unit or area of concern at the facility, regardless of the time at which waste was placed in the unit, as required under 40 CFR §264.101. Corrective measures may address releases to air, soils, surface water or groundwater.

I.G.3. "Director" means the Director of the EPA Region VIII Waste Management Division, or his/her designee.

I.G.4. "Facility" for purposes of this permit includes any contiguous property and structures, other appurtenances, and improvements on the property, under the control of the owner or operator seeking a permit under Subtitle C of RCRA.

I.G.5. A "hazardous constituent" means any constituent identified in Appendix VIII of 40 CFR §261 or any constituent identified in Appendix IX of 40 CFR §264.

I.G.6. Land Disposal" for purposes of this permit and 40 CFR Part 268 means placement in or on the land and includes, but is not limited to, placement in a landfill, surface impoundment, waste pile, injection well, land treatment facility, salt dome formation, underground mine or cave, or concrete vault or bunker intended for disposal purposes.

I.G.7. "Regional Administrator" means the Regional Administrator of the Environmental Protection Agency, Region VIII, or his/her designee.

I.G.8. A "release" means any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into the environment of any hazardous waste or hazardous constituents.

I.G.9. "Solid waste" means garbage, refuse, sludge from a wastewater treatment plant, and other discarded material, including solid, liquid, semisolid, or contained gaseous material resulting from industrial, commercial, mining, and agricultural operations, and from community activities, but does not include solid or dissolved material in domestic sewage, or solid or dissolved materials in irrigation return flows or industrial discharges which are point sources subject to permits under section 402 of the Federal Water Pollution Control Act, as amended (86 Stat. 880), or source, special nuclear, or by-product material as defined by the Atomic Energy Act of 1954, as amended (68 Stat. 923).

I.G.10. A "solid waste management unit" (SWMU) means any discernible unit which has been used for the treatment, storage, or disposal of solid wastes at any time, irrespective of whether the unit was intended for the management of solid or hazardous waste. SWMUs include RCRA-regulated hazardous waste management units. Such units include any area at a facility at which solid wastes have been routinely and systematically released.

I.G.11. A "unit" for the purposes of this permit includes, but is not limited to, any landfill, surface impoundment, waste pile, land treatment unit, incinerator, injection well, tank, container storage area, septic tank, drain field, wastewater treatment unit, elementary neutralization unit, transfer station, or recycling unit.

PART II - CORRECTIVE ACTION

II.A. APPLICABILITY

The Conditions of this Part apply to:

II.A.1. The solid waste management units (SWMUs) and areas of concern (AOCs) identified in the approved RFI Workplan as requiring further investigation. After the RFI Workplan is approved, Appendix A will be modified to distinguish between those SWMUs and AOCs requiring further investigation and those which do not.

II.A.2. Any additional SWMUs or AOCs discovered during the course of groundwater monitoring, field investigations, environmental audits, or by other means which are determined by EPA to require investigation.

II.B. NOTIFICATION AND ASSESSMENT REQUIREMENTS FOR NEWLY IDENTIFIED SWMUs AND AOCs

II.B.1. The Permittee shall notify the Director in writing, within fifteen (15) calendar days of discovery, of any additional SWMUs or AOCs as discovered under Condition II.A.2. The notification shall include, at a minimum, the location of the SWMU or AOC and all available information pertaining to the nature of the release (e.g., media affected, hazardous constituents released, magnitude of release, etc.). If the Director determines that further investigation of the SWMU or AOC is required, the permit will be modified in accordance with 40 CFR §270.41.

II.B.2. The Permittee shall prepare and submit to the Director, within ninety (90) calendar days of notification, a written assessment of each SWMU or AOC identified under Condition II.B.1. At a minimum, this assessment shall include the following information:

a. Location of unit(s) on a topographic map of appropriate scale such as required under 40 CFR §270.14(b)(19).

b. Designation of type and function of unit(s).

c. General dimensions, capacities and structural description of unit(s) (including any available plans/drawings).

d. Dates that the unit(s) was operated.

e. Specification of all wastes that have been managed at/in the unit(s) to the extent available. This must

include any available data on hazardous constituents in the wastes.

f. All available information pertaining to any release of hazardous waste or hazardous constituents from such unit(s) (to include groundwater data, soil analyses, air, and/or surface water data).

II.B.3. Based on the results of the assessment, the Director shall determine the need for further investigations of the units addressed in the assessment. If the Director determines that such investigations are needed, the Permittee shall be required to prepare a plan for such investigations as outlined in Condition II.D.1.b.

II.C. NOTIFICATION REQUIREMENTS FOR NEWLY DISCOVERED RELEASES AT PREVIOUSLY IDENTIFIED SWMUs and AOCs

II.C.1. The Permittee shall notify the Director in writing of any newly discovered release(s) of hazardous waste or hazardous constituents discovered during the course of groundwater monitoring, field investigations, environmental audits, or other means, within fifteen (15) calendar days of discovery. Such newly discovered releases may be from SWMUs or AOCs identified in Conditions II.A.1 or II.A.2 for which further investigation under Condition II.B.3 was not required.

II.C.2. If the Director determines that further investigation of the SWMUs or AOCs is needed, the Permittee shall be required to prepare a plan for such investigations as outlined in Condition II.D.1.b.

II.D. RCRA FACILITY INVESTIGATION (RFI)

II.D.1. RFI Workplan(s)

II.D.1.a. The Permittee shall prepare and submit to the Director, within ninety (90) calendar days of the effective date of this permit, a RCRA Facility Investigation (RFI) Workplan for those units identified in Appendix A. This Workplan shall be developed to meet the requirements of Condition II.D.1.c.

II.D.1.b. The Permittee shall prepare and submit to the Director, within ninety (90) calendar days of notification, an RFI Workplan for those units identified under Condition II.B.3 or Condition II.C.2. This RFI Workplan(s) shall be developed to meet the requirements of Condition II.D.1.c.

II.D.1.c. The RFI Workplan(s) shall meet the requirements of Appendix B at a minimum. The Workplan(s) shall include

schedules and a cost estimate for implementation and completion of specific actions necessary to determine the nature and extent of releases and the potential pathways of contaminant releases to the air, land, surface water, and groundwater. The Permittee must provide sufficient justification and/or documentation to exclude particular units, media or pathways associated with a unit (groundwater, surface water, soil, subsurface gas, or air). Such deletions of a unit, medium or pathway from the RFI(s) are subject to the approval of the Director. The Permittee shall provide sufficient written justification for any omissions or deviations from the minimum requirements of Appendix B. Such omissions or deviations are subject to the approval of the Director. In addition, the scope of the RFI Workplan(s) shall include all investigations necessary to ensure compliance with 40 CFR §264.101.

II.D.1.d. The RFI Workplan(s) must be approved by the Director, in writing, prior to implementation. The letter approving the RFI Workplan(s) shall specify the start date of the RFI Workplan schedule. If the Director disapproves the RFI Workplan(s), he/she shall either (1) notify the Permittee in writing of the RFI Workplan's deficiencies and specify a due date for submission of a revised RFI Workplan, or (2) revise the RFI Workplan and notify the Permittee of the revisions and the start date of the schedule within the approved RFI Workplan.

II.D.2. RFI Implementation

The Permittee shall implement the RFI(s) in accordance with the approved RFI Workplan(s) and Appendix B. The Permittee shall notify the Director no less than fourteen (14) days prior to any sampling activity.

II.D.3. RFI Reports

II.D.3.a. The Permittee shall provide the Director with monthly RFI Progress Reports every beginning thirty (30) calendar days from the start date specified in the RFI Workplan approval letter. The Progress Reports shall contain the following information at a minimum:

i. A description of the portion of the RFI completed;

ii. Summaries of findings;

iii. Summaries of all deviations from the approved RFI Workplan during the reporting period;

iv. Summaries of all problems or potential problems

encountered during the reporting period;

v. Projected work for the next reporting period; and

vi. Copies of daily reports, inspection reports, laboratory/monitoring data, etc.

II.D.3.b. The Permittee shall prepare and submit to the Director Draft and Final RCRA Facility Investigation Report(s) for the investigations conducted pursuant to the Workplan(s) submitted under Condition II.D.1. The Draft RFI Report(s) shall be submitted to the Director for review in accordance with the schedule in the approved RFI Workplan(s). The Final RFI Report(s) shall be submitted within forty-five (45) calendar days of receipt of EPA's comments on the Draft RFI Report. The RFI Report(s) shall include an analysis and summary of all required investigations of SWMUs and AOCs and their results. The summary shall describe the type and extent of contamination at the facility, including sources and migration pathways, and a description of actual or potential receptors. The Report(s) shall also describe the extent of contamination (qualitative and quantitative) in relation to background levels indicative of the area. The objective of this task shall be to ensure that the data generated during the investigation are sufficient in quality (e.g., quality assurance procedures have been followed) and quantity to describe the nature and extent of contamination, potential threat to human health and/or the environment, and to support a Corrective Measures Study, if necessary.

II.D.3.c. The Director will review the Final RFI Report(s) and notify the Permittee of the need for further investigative action and/or the need for a Corrective Measures Study to meet the requirements of II.F. and 40 CFR §264.101. He/she will also notify the Permittee if no further action is required.

II.E. INTERIM MEASURES (IM)

II.E.1. IM Workplan

II.E.1.a. Upon notification by the Director, the Permittee shall prepare and submit an Interim Measures (IM) Workplan for any SWMU or AOC which poses a current or potential threat to human health or the environment. The IM Workplan shall be submitted within thirty (30) calendar days of such notification and shall include the elements listed in II.E.1.b. Such interim measures may be conducted concurrently with investigations required under the terms of this permit.

II.E.1.b. The IM Workplan shall ensure that the interim measures are designed to mitigate any current or potential threat(s) to human health or the environment and are consistent with and integrated into any long-term solution at the facility. The IM Workplan shall include the interim measures objectives, procedures for implementation (including any designs, plans, or specifications), and schedules for implementation.

II.E.1.c. The IM Workplan must be approved in writing by the Director prior to implementation. The written approval shall specify the starting date of the IM Workplan schedule. If the Director disapproves the IM Workplan, he/she shall either (1) notify the Permittee in writing of the IM Workplan's deficiencies and specify a due date for submission of a revised IM Workplan, or (2) revise the IM Workplan and notify the Permittee of the revisions and the start date of the schedule within the approved IM Workplan.

II.E.2. IM Implementation

II.E.2.a. The Permittee shall implement the interim measures in accordance with the approved IM Workplan.

II.E.2.b. The Permittee shall give notice to the Director as soon as possible of any planned changes, deletions or additions to the IM Workplan.

II.E.2.c. Final approval of corrective action required under 40 CFR §264.101 which is achieved through interim measures shall be in accordance with 40 CFR §270.41 and Condition II.G. as a permit modification.

II.E.3. IM Reports

II.E.3.a. The Permittee shall provide EPA with progress reports on the IM as part of the monthly reporting required under Condition II.D.3.a., beginning thirty (30) calendar days from the starting date specified in the IM Workplan approval letter.

II.E.3.b. The Permittee shall prepare and submit an IM Report to the Director, within sixty (60) calendar days of completion of interim measures conducted under Condition II.E. The IM Report shall contain the following information at a minimum:

a. A description of interim measures implemented;

b. Summaries of results;

c. Summaries of all problems encountered;

d. Summaries of accomplishments and/or effectiveness of interim measures; and

e. Copies of all relevant laboratory/monitoring data, etc. in accordance with Condition I.D.9.

II.F CORRECTIVE MEASURES STUDY

II.F.1. Corrective Measures Study (CMS) Plan

II.F.1.a. The Permittee shall prepare and submit a CMS Plan for those units requiring a CMS within sixty (60) calendar days of notification by the Director that a CMS is required. This CMS Plan shall be developed to meet the requirements of Condition II.F.1.b.

II.F.1.b. The CMS Plan shall meet the requirements of Appendix C. The CMS Plan shall include schedules of implementation and completion of specific actions necessary to complete a CMS. The Permittee must provide sufficient justification and/or documentation for any unit deleted from the CMS Plan. Such deletion of a unit is subject to the approval of the Director. The CMS shall be conducted in accordance with the approved CMS Plan. The Permittee shall provide sufficient written justification for any omissions or deviations from the minimum requirements of Appendix C. Such omissions or deviations are subject to the approval of the Director. The scope of the CMS Plan shall include all investigations necessary to ensure compliance with 3004(u), 3005(c)(3), 40 CFR §264.101, and §270.32(b)(2). The Permittee shall implement corrective actions beyond the facility boundary, where necessary to protect human health and the environment, unless the Permittee demonstrates to the satisfaction of the Director, that, despite the Permittee's best efforts, it was unable to obtain the necessary permission to undertake such actions. The Permittee is not relieved of all responsibility to clean up a release that has migrated beyond the facility boundary where off-site access is denied. On-site measures to address such releases will be determined on a case-by-case basis. Assurances of financial responsibility for completion of such off-site corrective action will be required.

II.F.1.c. The Director shall either approve or disapprove, in writing, the CMS plan. If the Director disapproves the CMS Plan, he/she shall either (1) notify the Permittee in writing of the CMS Plan's deficiencies and specify a due date for submittal of a revised CMS Plan, or (2) revise

the CMS Plan and notify the Permittee of the revisions. This modified CMS Plan becomes the approved CMS Plan.

II.F.2. Corrective Measures Study Implementation

The Permittee shall implement the Corrective Measures Study according to the schedules specified in the CMS Plan. Pursuant to Permit Condition II.F.1.c., the CMS shall be conducted in accordance with the approved CMS Plan.

II.F.3. CMS Report

II.F.3.a. The Permittee shall prepare and submit to the Director a draft and final CMS Report for the study conducted pursuant to the approved CMS Plan. The draft CMS Report shall be submitted to the Director in accordance with the schedule in the approved CMS Plan. The final CMS Report shall be submitted to the Director within thirty (30) calendar days of receipt of EPA comments on the draft CMS Report. The CMS Final Report shall include an evaluation of each remedial alternative and present all information gathered under the approved CMS Plan. The CMS Final Report must contain adequate information to support the Director's decisions on the recommended remedy, described under Permit Condition II.G.

II.F.3.b. If the Director determines that the CMS Final Report does not fully satisfy the information requirements specified under Permit Condition II.F.3.a., he/she may disapprove the CMS Final Report. If the Director disapproves the CMS Final Report, he/she shall notify the Permittee in writing of any deficiencies and specify a due date for submittal of a revised CMS Final Report. He/she will also notify the Permittee if no further action is required.

II.F.3.c. As specified under Permit Condition II.F.3.b., based on preliminary results and the CMS Final Report, the Director may require the Permittee to evaluate additional remedies or particular elements of one or more proposed remedies.

II.G. REMEDY APPROVAL AND PERMIT MODIFICATION

II.G.1 A remedy shall be selected by the Director from the remedial alternatives evaluated in the CMS. It will be based at a minimum on protection of human health and the environment, existing law and regulations, and guidance.

II.G.2. Pursuant to 40 CFR §270.41, a permit modification will be initiated by the Director after selection of a remedy under Condition II.G.1.

II.G.3. Within ninety (90) calendar days after this Permit has been modified, the Permittee shall demonstrate financial assurance for completing the approved remedy.

II.H. MODIFICATION OF THE CORRECTIVE ACTION COMPLIANCE SCHEDULE

II.H.1. If at any time the Director determines that modification of the Compliance Schedule (Appendix D) is necessary, he/she may initiate a modification to the schedule in accordance with the procedures contained in 40 CFR Part 270.41.

II.I. IMMINENT HAZARDS

II.I.1. The Permittee shall report to the Director any imminent or existing hazard to public health or the environment from any release of hazardous waste or hazardous constituents. Such information shall be reported orally within 24 hours from such time the Permittee becomes aware of the circumstances. This report shall include the information specified under Conditions I.D.14.a and b.

II.I.2. A written report shall also be provided to the Director within five (5) calendar days of the time the Permittee becomes aware of the circumstances. The written report shall contain the information specified under Conditions I.D.14.a and b; a description of the release and its cause; the period of the release; whether the release has been stopped and if not, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent recurrence of the release.

II.J. PLAN AND REPORT REQUIREMENTS

II.J.1. All plans and schedules shall be subject to approval by the Director prior to implementation. The Permittee shall revise all submittals and schedules as specified by the Director. Upon approval the Permittee shall implement all plans and schedules as written.

II.J.2. The results of all plans and reports shall be submitted in accordance with the approved schedule. Extensions of the due date for submittals may be granted by the Director based on the Permittee's demonstration that sufficient justification for the extension exists.

II.J.3. If the Permittee at any time determines that the written assessment required under Condition II.B or RFI Workplan(s) required under Condition II.D no longer satisfies the requirements of 40 CFR §264.101 or this permit for prior or continuing releases of hazardous waste

or hazardous constituents from solid waste management units or areas of concern, the Permittee shall submit an amended RFI Workplan(s) to the Director within sixty (60) calendar days of such determination.

II.J.4. All reports shall be signed and certified in accordance with 40 CFR §270.11.

II.J.5. Three (3) copies of all reports and plans shall be provided by the Permittee to the Director at the following address:

John F. Wardell, Director
Montana Office
U.S. Environmental Protection Agency (8MO)
301 S. Park, Drawer 10096
Helena, MT 59626

II.K. FINANCIAL ASSURANCE FOR RFI, CMS, AND/OR INTERIM MEASURE

II.K.1. Within forty-five (45) days of receipt of written EPA approval of the Workplans, including any Interim Measure Workplans approved under this permit, the Permittee shall provide financial assurance in compliance with 40 CFR 264.144 through 40 CFR 264.148.

II.K.2. The purpose of financial assurance in this permit is to guarantee performance of and payment for the RFI, CMS and/or Interim Measure activities and to provide liability insurance coverage for third-party injury and property damage claims resulting from sudden and non-sudden accidental occurrences arising from any activity performed in accordance with the corrective action provisions of this permit.

II.K.3. The term "RFI, CMS and/or Interim Measure," as appropriate, shall be substituted for the word "post-closure" when referring to 40 CFR 264.144 through 40 CFR 264.148. Also, the word "Permittee" shall be substituted for the words "owner or operator" when referring to 40 CFR 264.144 through 40 CFR 264.148.

II.K.4. The Permittee shall comply with the requirements of 40 CFR 264.144 regarding the cost estimates for all corrective action measures required by this permit, including studies, reports and plan submissions. The requirements of 40 CFR 264.144 shall continue beyond the active life of any or all hazardous waste units at the facility and will include: subsection (a)(1) third party costs; subsection (b) annual inflation adjustments; and, subsection (c) revision of the cost estimate when there has been a change in the RFI, CMS, Interim Measure activities and Workplans

which results in an increase in the cost of such activities even though the facility may have had closure certification accepted by MDHES.

II.K.5. Within forty-five (45) days of receipt of written EPA approval of the Workplans, including any Interim Measure Workplans approved under this permit, the Permittee shall provide financial assurance for the RFI, CMS, and/or Interim Measure activities as set forth in 40 CFR 264.145. If the Permittee is using a financial test or guarantee, all facilities in the United States and its territories that are also being covered by the financial test or guarantee of the Permittee must be listed, and the amounts covered must be included in Alternative I or Alternative II, whichever is appropriate.

II.K.6.a. Within forty-five (45) days of receipt of written EPA approval of the Workplans, the Permittee shall provide liability coverage using one or a combination of the mechanisms allowed under 40 CFR 264.147. The liability coverage for sudden and non-sudden occurrences arising solely from RFI, CMS and/or Interim Measure activities shall consist of $10 million per occurrence with $20 million annual aggregate exclusive of legal defense costs.

II.K.6.b. If the Director determines that the levels of financial responsibility required by Condition II.K.6.a. are not consistent with the degree and duration of risk associated with the RFI/CMS and/or Interim Measure activities at the facility, the Director may adjust the level of financial responsibility required under Condition II.K.6.a. as may be necessary to protect human health and the environment. This adjusted level will be based on the Director's assessment of the degree and duration of risk associated with RFI, CMS, and/or Interim Measure activities at the facility. The Permittee must furnish to the Director, within a reasonable time, information which the Director requests which EPA does not possess related to RFI, CMS, and Interim Measure activities to determine whether cause exists for such adjustments of level or type of coverage.

II.K.7. The Permittee may complete the financial assurance requirements for this permit with any instrument(s) being using for closure and/or post-closure as required by 40 CFR Part 264 or 40 CFR Part 265, providing the Permittee assures that the monies for compliance with this permit are separate from closure/post-closure and are clearly identified as such.

II.K.8. If EPA determines that the Permittee has failed to perform the RFI, CMS, and/or Interim Measure activities in accordance with any of the terms or conditions of this

permit, EPA will provide written notification to the Permittee of its intent to utilize the Permittee's financial responsibility instruments for the purpose of undertaking such performance. Notification of intent to draw on the Permittee's financial instrument will specify in detail the Agency's reasons for taking such action.

II.K.9. The Permittee shall comply with the requirements of 40 CFR 264.148 with regard to the incapacity of the Permittee, its guarantors or financial institutions issuing financial mechanisms in compliance with the requirements of this permit.

II.K.10. In the event that EPA publishes changes to 40 CFR 264 Subpart H and 40 CFR 265 Subpart H after the effective date of this permit, EPA may consider a revision of the financial requirements of this permit in accordance with these published changes.

PART III - WASTE MINIMIZATION

III.A. Pursuant to 40 CFR §264.73(b)(9), and Section 3005(h) of RCRA, 42 U.S.C. 6925(h), the Permittee must certify in writing, no less often than annually, that:

III.A.1. The Permittee has a program in place to reduce the volume and toxicity of hazardous waste to the degree determined to be economically practicable; and

III.A.2. The proposed method of treatment, storage or disposal is the most practicable method available to the permittee which minimizes the present and future threat to human health and the environment.

III.B. The Permittee shall maintain copies of this certification in the facility operating record as required by 40 CFR Part 264.73(b).

III.C. The Waste Minimization certification required under III.A. above shall address the elements listed in Appendix E.

PART IV - LAND DISPOSAL RESTRICTIONS

IV.A. GENERAL RESTRICTIONS

IV.A.1. 40 CFR Part 268 identifies hazardous wastes that are restricted from land disposal and defines those limited circumstances under which an otherwise prohibited waste may continue to be placed on or in a land treatment, storage or disposal unit. The Permittee shall maintain compliance with all requirements of 40 CFR Part 268. Where the Permittee has applied for an extension, waiver or variance under 40 CFR Part 268 the Permittee shall comply with all restrictions on land disposal under this Part once the effective date for the waste has been reached pending final approval of such application.

IV.B. LAND DISPOSAL PROHIBITIONS AND TREATMENT STANDARDS

IV.B.1. A restricted waste identified in 40 CFR Part 268 Subpart C may not be placed in a land disposal unit unless the requirements of 40 CFR Part 268 Subparts C and D are met.

IV.B.2. The storage of hazardous wastes restricted from land disposal under 40 CFR Part 268 is prohibited unless the requirements of 40 CFR Part 268 Subpart E are met.

IV.B.3. The Permittee must meet the requirements in 40 CFR §268.4 if any restricted waste(s) is treated in the surface impoundment(s) on-site.

Part V - ORGANIC AIR EMISSIONS

V.A. The Permittee is required to comply with any applicable sections of 40 CFR Part 264, Subpart BB, relating to the control of organic air emissions from process vents and equipment leaks associated with hazardous waste management units.

V.B. If and when Phase II of the RCRA organic air emissions regulations is promulgated, the Permittee is required to comply with any requirements concerning surface impoundments and tanks.

Part VI - TOXICITY CHARACTERISTIC (TC) RULE

VI.A. The Permittee is required to comply with 40 CFR Part 261.24 concerning the addition of 25 organic chemicals and the replacement of the Extraction Procedure (EP) leach test with the Toxicity Characteristic Leaching Procedure (TCLP) test.

VI.A.1. No later than September 25, 1991, the Permittee must submit a certification for the installation, operation, and maintenance of a ground-water monitoring system which meets the requirements of §265.90 through §265.94, a certification of financial responsibility, and a Part B permit application for any units subject to this requirement.

VI.A.2. No later than March 29, 1994, any units newly regulated as a result of the TC rule, must meet the minimum technology requirements of RCRA Sections 3004(o) and 3015.

Part VII - PETROLEUM REFINERY PRIMARY AND SECONDARY OIL/WATER/SOLIDS SEPARATION SLUDGE HAZARDOUS WASTE LISTING

VII.A. The Permittee is required to comply with 40 CFR Part 261.31 concerning the listing of oil/water/solids separator sludges and/or floats generated in the primary treatment of oily wastewaters from petroleum refining as hazardous waste.

APPENDIX A

Solid Waste Management Units
Cenex Laurel Refinery

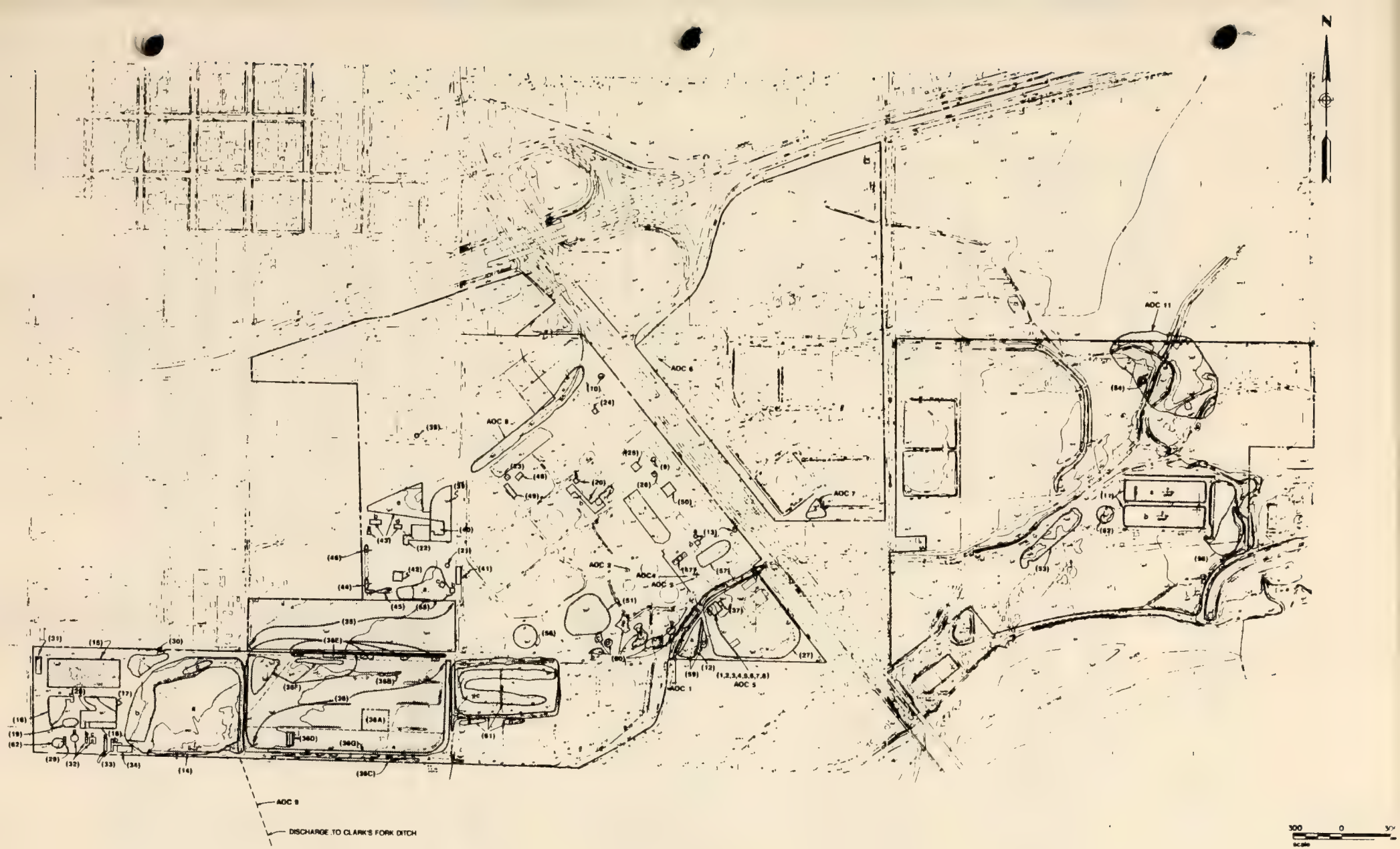
Unit Number	Unit Name
Active SWMUs:	
1	Hydrocyclone
2	23 Tank
3	44 Tank
4	Pilkenroad Tilted Plate Separators
5	API Separator
6	Dissolved Air Flotation Unit
7	Sludge Pit
8	Separation Towers
9	Clarifier
10	Sour Water Stripper
11	Wastewater Retention Pond System
12	Sputnik
13	HF Neutralization Pits
14	Old Landfill
15	Pitch Waste Area
16	Asphalt Waste Area
17	FCC Catalyst Waste Area
18	Hot Process Lime Softener Waste Area
19	Calcium Fluoride Disposal Area 1
20	Half-Drum Storage Area and Reclaimer
21	Asbestos Waste Tanks
22	Wood Burn Area
23	Pitch and Asphaltic Material Reclaimer
24	Spent Caustic Recycler Tank
25	Heat Exchanger Cleaning Pad
26	Spent Lime Sludge Tank
27	Scrap and Drum Area
28	Miscellaneous Waste Area 3
Inactive SWMUs	
29	Calcium Fluoride Disposal Area 2
30	Old Landfill Area 2
31	Leaded Tank Bottom Trench
32	Asphaltic Material Trenches 1
33	Spent Lime Sludge Trenches
34	Asphaltic Material and Spent Lime Sludge Disposal Area
35	New Land Farm (RCRA-regulated unit)
36	Old Land Farm (RCRA-regulated unit)

36A	Dike K052 Area (RCRA-regulated unit)
36B	Asphaltic Material Trenches 2
36C	Asphaltic Material and Misc. Sludges 1
36D	Asphaltic Material and Misc. Sludges 2
36E	Scrap Metal Trenches
36F	Scrap Storage Area
36G	Alumina and Dryer Sieves Disposal Areas
37	Leaded Tank Bottom Storage Area
38	Reclaimer
39	Container Storage Area
40	Asphaltic Barrel Disposal Area
41	Asbestos Waste Disposal Area
42	Garbage Disposal Area
43	Asphaltic Material Disposal Area
44	Cooling Tower Sludge Trench
45	Cooling Tower Sludge and Garbage
46	Asbestos Trench
47	Caustic Material Pit
48	Reclaimer
49	Asphalt Container Storage Area
50	Old API Separator Area
51	Scrap Disposal Area
52	Burn Pit
53	Burn Pit Disposal Area
54	"Smokeless" Incinerator Site
55	Treatment Pond Sludge Disposal Area
56	Clarifier and Spent Lime Sludge Disposal Area
57	Asphaltic Material/Lagoon Area
58	Drum Storage/Disposal Areas
59	Wastewater Impoundment Area
60	South Liquid Waste Pits
61	Land Application Area
62	Disturbed Area

Areas of Concern

1	Clarks Fork Ditch
2	Cycle Oil Loading Rack
3	Hot Oil Belt Heater Unit
4	Sulfur Recovery Unit
5	Mobile Storage Tank
6	Underground Storage Tanks (UST-regulated units)
7	Tank Truck Unloading Area
8	Tank Car Loading Rack
9	Covered Drain Ditch
10	Refinery Sewer System
11	Oil on Ground Water

(RCRA-regulated unit = regulated by state Hazardous Waste Program)
(UST-regulated unit = regulated by state Underground Storage Tank Program)



WASTE UNITS AND AREAS OF CONCERN
OUTSIDE OF THE FACILITY
CENEX REFINERY
LAUREL, MONTANA

ERM-Southwest, Inc.

HOUSTON TE

APPENDIX B

RCRA FACILITY INVESTIGATION (RFI) WORKPLAN OUTLINE

I. RFI WORKPLAN REQUIREMENTS

The Permittee shall prepare a RCRA Facility Investigation (RFI) Workplan that meets the requirements of Parts II and III of this permit and the RCRA Facility Investigation Guidance, EPA-530/SW-89-031. This Workplan shall include the development of the following plans, which shall be prepared concurrently:

A. Project Management Plan

The Permittee shall prepare a Project Management Plan which will include a discussion of the technical approach, schedules, budget and personnel. The Project Management Plan shall also include a description of qualifications of personnel performing or directing the RFI, including contractor personnel. This plan shall also document the overall management approach to the RCRA Facility Investigation.

B. Sampling and Analysis Plan

The Permittee shall prepare a plan to document all monitoring procedures including but not limited to the sampling and analytical procedures to be performed during the investigation to characterize the environmental setting, source, and releases of hazardous constituents, so as to ensure that all information and data are valid and properly documented. The Sampling and Analysis Plan shall include the following :

1. Data Collection Strategy

a. A description of the intended uses for the data and the necessary level of precision and accuracy for these uses;

b. A description of the methods and procedures to be used to assess the precision, accuracy and completeness of the data;

c. A description of the rationale used to assure that the data accurately and precisely represent a characteristics of a population, parameter variations at a sampling point, a process condition or an environmental condition. Examples of factors which shall be considered and addressed include:

i) Environmental conditions at the time of sampling;

ii) Number of sampling points;

iii) Representativeness of selected media; and

iv) Representativeness of selected analytical parameters.

d. A description of the measures to be taken to assure that the following data sets are comparable:

i) RFI data generated by the Permittee;

ii) RFI data generated by an outside laboratory or consultant versus data generated by the Permittee; and

iii) Data generated by separate consultants or laboratories.

e. Details relating to the schedule and information to be provided in quality assurance reports, including:

i) Periodic assessment of measurement data accuracy, precision, and completeness;

ii) Results of performance audits;

iii) Results of system audits;

iv) Significant quality assurance problems and recommended solutions, and

v) Resolutions of previously stated problems.

2. Sampling Strategy

a. Selecting appropriate sampling locations, depths etc.;

b. Providing a statistically significant number of sampling sites;

c. Obtaining all necessary ancillary data;

d. Determining conditions under which sampling should be conducted;

e. Determining which media are to be sampled (e.g., groundwater, air, soil, sediment, subsurface gas);

f. Determining which parameters are to be measured and where and documenting the rationale for parameter selection;

g. Selecting the frequency of sampling and length of sampling period;

h. Selecting the types of samples (e.g., composites vs. grabs) and number of samples to be collected; and

i. Preventing contamination of the sampling equipment and cross contamination between sampling points.

3. Sampling procedures

a. Documenting sampling operations and procedures, including;

i) Documentation of procedures for preparation of reagents or supplies which become an integral part of the sample (e.g., filters, preservatives, and absorbing reagents);

ii) Procedures and forms for recording the exact location and specific considerations associated with sample acquisition;

iii) Documentation of specific sample preservation methods;

iv) Calibration of instruments;

v) Collection of replicate samples;

vi) Submission of field-based blanks, where appropriate;

vii) Potential interferences present at the facility;

viii) Construction materials and techniques associated with monitoring wells and piezometers;

ix) Field equipment listing and sampling containers;

x) Sampling order; and

xi) Decontamination procedures.

b. Selecting appropriate sample containers;

c. Sampling preservation; and

d. Chain-of-custody, including:

i) Standardized field tracking reporting forms to establish sample custody in the field prior to shipment; and

ii) Pre-prepared sample labels containing all information necessary for sample tracking.

4. Field Measurements

   a. Determining which parameters are to be measured and where;

   b. Selecting the frequency of field measurements and length of field measurement period;

   c. Providing a statistically significant number of field measurements;

   d. Determining conditions under which field measurements should be conducted;

   e. Determining which media are to be addressed by appropriate field measurements (e.g., ground water, air, soil, sediment, etc.);

   f. Documenting field measurement operations and procedures, including:

      i) Procedures and forms for recording raw data and the exact location, time, and facility-specific considerations associated with the data acquisition;

      ii) Calibration of field instruments;

      iii) Collection of replicate measurements;

      iv) Submission of field-based blanks, where appropriate;

      v) Potential interferences present at the facility;

      vi) Construction materials and techniques associated with monitoring wells and piezometers used to collect field data;

      vii) Field equipment listing;

      viii) Order in which field measurements will be made; and

      ix) Decontamination procedures.

5. Sample Analysis

   Sample analyses shall be conducted in accordance with the most recent edition of EPA document SW-846, Test Methods for Evaluating Solid Waste or an equivalent method approved by the Director. The sample analysis section of the Sampling and Analysis Plan shall specify the following:

a. Chain-of-custody procedures, including:

   i) Identification of the responsible party at the laboratory who is authorized to sign for incoming field samples, obtain documents of shipment, and verify the data entered onto the sample custody records;

   ii) Use of a laboratory sample custody log consisting of serially numbered standard lab-tracking report sheets; and

   iii) Specification of laboratory sample custody procedures for sample handling, storage, and dispersement for analysis.

b. Sample storage, procedures, and storage times;

c. Sample preparation methods;

d. Analytical procedures, including:

   i) Scope and application of the procedure;
   ii) Sample matrix;
   iii) Potential interferences;
   iv) Precision and accuracy of the methodology; and
   v) Method detection limits.

e. Calibration procedures and frequency;

f. Data reduction, validation and reporting;

g. Internal quality control checks, laboratory performance and systems audits and frequency, including:

   i) Method blank(s);
   ii) Laboratory control sample(s);
   iii) Calibration check sample(s);
   iv) Replicate sample(s);
   v) Matrix-spiked sample(s);
   vi) "Blind" quality control sample(s);
   vii) Control charts;
   viii) Surrogate samples;
   ix) Zero and span gases; and
   x) Reagent quality control checks.

h. Preventive maintenance procedures and schedules;

i. Corrective action (for laboratory problems); and

j. Turnaround time.

6. Groundwater investigations

a. Monitoring system design

1) Downgradient wells must be located at the edge of solid waste management units to satisfy regulatory requirements for release detection and no migration of hazardous constituents beyond the site boundary. The horizontal placement of these wells shall be such that they intercept potential pathways for contaminant migration. Wells shall monitored at each depth necessary to ensure immediate detection of a release.

2) Upgradient or background wells must be installed at appropriate locations and depths to yield ground-water samples from the uppermost aquifer that represent the quality of uncontaminated water that has not been affected by leakage from a SWMU. A sufficient number of wells shall be installed to allow for stratified comparisons of water quality and to account for spatial variability in ground-water quality.

b. Monitoring well drilling methods

The following standards shall be adhered to when drilling monitoring wells:

1) Drilling shall be performed in a manner that minimizes the disturbance and maintains the natural properties of the subsurface materials;

2) Contamination and/or cross-contamination of ground water and aquifer materials shall be avoided;

3) The drilling method must allow for the collection of representative samples of rock, unconsolidated materials, and soil;

4) The drilling method must allow the owner/operator to determine when the appropriate location for the screened interval has been encountered;

5) The drilling method should allow a minimum of 4 inches of annular space around the well casing and screen within which to place the filter pack and annular sealants; and

6) The drilling method must allow for the collection of representative ground-water samples. Drilling muds should be used only when minimal impact to the

surrounding formation and ground-water can be ensured.

c. Monitoring well design and construction

The most suitable material for a particular well at a particular site will depend on the characteristics of the site hydrogeology. The following factors must be taken into consideration: depth to the water-bearing zone, geochemistry of the soil and rock over the entire interval in which the well is to be cased, and the chemistry of the ground water at the site. In addition, the screens and casing of all ground-water wells shall be: 1) inert in the water being tested and 2) chemically resistant to any contaminants that are present in the aquifer(s) being monitored.

1. The appropriate length of well screens varies from site to site however, the Permittee must provide justification for any screen which cuts across hydraulically separated geologic units. Well screens must be factory slotted or the equivalent. Field slotting is not permitted under any conditions.

2. All wells shall have a bottom sump to allow sediments that may enter the well to settle without resulting in silting in of the well.

3. The annular space between the borehole wall and the screen or slotted casing shall be filled to minimize passage of formation materials into the well.

4. A filter pack shall be used when the natural formation is: 1) poorly sorted; 2) a uniform fine sand, silt, or clay; 3) very thin-bedded; 4) poorly cemented sandstone; or 5) highly fractured or characterized by relatively large solution channels. Filter pack material must be chemically inert and may not be constructed from fabric.

d. Annular sealant

1. Proper sealing of the well annulus is required. Sealant materials shall be chemically compatible with the highest anticipated concentration of chemical constituents that may be expected in the ground water.

2. When the screened interval is within the saturated zone, a minimum of two feet of sealing material shall be placed immediately over the protective sand layer overlying the filter pack.

3. The precise volume of filter pack material and sealant required shall be calculated before placement and the actual volumes used shall be determined during well construction. Any discrepancies between the calculated volumes and the actual volumes require an explanation.

e. Surface completion

1. A monitoring well surface seal shall be installed on top of the annular sealant and extend vertically up the well annulus between the well casing and the borehole to the land surface.

2. A protective casing shall be installed around the well casing to prevent damage or unauthorized entry.

3. A suitable cap must be placed on the well to prevent tampering or the entry of any foreign materials. A lock must be installed on the cap to provide security. Lubricants may not be applied to the lock.

f. Documentation of well design

The Permittee shall keep a record of the following information for each well:

1. A boring log;
2. A geologic log;
3. A well construction log;
4. Date of construction;
5. Drilling method and drilling fluid used;
6. Well location (± 0.5 ft);
7. Bore hole and well casing diameter;
8. Well depth (± 0.1 ft);
9. Drilling and lithologic logs;
10. Casing materials;
11. Screen materials and design;
12. Casing and screen joint types;
13. Screen slot size/length;
14. Filter pack material/size, grain analysis;
15. Filter pack volume calculations;
16. Filter pack placement method;
17. Sealant materials (% bentonite);
18. Sealant placement method;
19. Sealant volume (lbs gallon of cement);
20. Surface seal design construction;
21. Well development procedures;
22. Type of protective well cap;
23. Ground surface elevation (± 0.01 ft)
24. Surveyor's pin elevation (± 0.01 ft) on concrete

apron;
25. Top of monitoring well casing elevation (± 0.01 ft);
26. Top of protective steel casing elevation (± 0.01 ft); and
27. Detailed drawing of well (include dimensions).

7. Water level elevation determination

The following procedures shall be followed when determining water level elevations:

a. Field measurements shall include depth to standing water and total depth of the well to the bottom of the intake screen.

b. Prior to measurement, water levels in piezometers and wells shall be allowed to stabilize for a minimum of 24 hours after well construction and development or well purging.

c. Water level measurements from boreholes, piezometers, or monitoring wells used to define the water table or a single potentiometric surface shall be collected within less than 24 hours.

8. Well purging

The following procedures shall be followed when purging wells:

a. The purging method must ensure that all stagnant water is replaced by fresh formation water upon completion of the procedure.

b. If the purged water is contaminated or if its chemistry is unknown, the water must be stored in appropriate containers until analytical results are available, at which time proper arrangements for disposal or treatment must be made.

c. When purging a medium- to high-yielding well, the well shall not be pumped dry if recharge causes the formation water to cascade vigorously down the sides of the screen.

d. When purging a low-yielding well, under no circumstances shall the well be allowed to recover fully before sampling is started.

9. Sample collection

a. Monitoring well sampling shall always progress from

the well expected to be least contaminated to the well expected to be most contaminated. Samples to be analyzed for the most volatile constituents shall be collected and containerized first.

b. Equipment that minimizes agitation and reduces or eliminates contact with the atmosphere during sample transfer must be used.

c. The following equipment or materials are not acceptable: neoprene fittings, PVC bailers, tygon tubing, silicon rubber bladders, neoprene impellers, polyethylene, and viton.

10. Bailers

a. Bailers used in sampling ground water from monitoring wells shall be constructed of either fluorocarbon resin or stainless steel. The cable used to raise and lower the bailer shall also be an inert material or coated with an inert material.

b. Bailers shall never be dropped into a well and shall be removed in a manner that causes as little agitation as possible.

11. Sample preservation

a. All chemical preservatives must be added to the samples in the field.

b. A temperature history of the samples must be maintained. Upon receipt of a shipment, the laboratory must record the temperatures on the chain of custody record.

c. The laboratory must record the date/time sampled, the date/time received, the date/time extracted, and the date/time analyzed for all samples received.

d. Samples shall not be filtered in the field or transferred from one sample container to another.

e. No headspace shall exist in the containers of samples containing volatile organics.

C. Data Management Plan

The Permittee shall develop and initiate a Data Management Plan to document and track the RFI data and results. This plan shall identify and set up data documentation materials and procedures, project file requirements, and progress

reporting procedures and documents. The plan shall also describe the format for presenting the raw data and conclusions of the investigation.

1. Data Record

The data record shall include the following:

a. Unique sample or field measurement code;

b. Sampling or field measurement location and sample or measurement type;

c. Sampling or field measurement raw data;

d. Laboratory analysis ID number;

e. Property or component measures; and

f. Result of analysis (e.g. concentration).

2. Tabular Displays

The following data shall be presented in tabular displays:

a. Unsorted (raw) data;

b. Results for each medium, or for each constituent monitored;

c. Data reduction for statistical analysis, as appropriate;

d. Sorting of data by potential stratification factors (e.g., location, soil layer, topography); and

e. Summary data.

3. Graphical Displays

The following data shall be included and may be presented in graphical formats (e.g., bar graphs, line graphs, area or plan maps, isopleth plots, cross-sectional plots or transits, three dimensional graphs, etc.):

a. Display sampling location and sampling grid:

b. Indicate sampling locations and areas where more data are required;

c. Display geographical extent of contamination;

d. Display contamination levels, averages and maxima;

e. Display sampling locations and levels of contamination at each;

f. Illustrate changes in concentration in relation to distances from the source, time, depth or other parameters; and

g. Indicate features affecting inter-media or intramedia transport and show potential receptors.

D. Health and Safety Plan

The Permittee shall prepare a Health and Safety Plan which shall include the following:

1. A facility description including the locations of roads, water supply, electricity, and telephone service;

2. The known hazards and an evaluation of the risks associated with those hazards;

3. Key personnel and alternates responsible for site safety, response operations, and the protection of public health.

4. A description of the work area;

5. Levels of protection to be worn by personnel;

6. Procedures to control site access;

7. Decontamination procedures for personnel and equipment;

8. Site emergency procedures;

9. Emergency medical care for injuries and toxicological problems;

10. Requirements for an environmental surveillance program;

11. Routine and special training required for responders; and

12. Procedures for protecting workers from weather-related problems.

The Health and Safety Plan shall be consistent with:

1. NIOSH Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities (1985);

2. EPA Order 1440.1 - Respiratory Protection;

3. EPA Order 1440.3 - Health and Safety Requirements for Employees Engaged in Field Activities;

4. Facility Contingency Plan;

5. EPA Standard Operating Safety Guide (1984);

6. OSHA regulations, particularly in 29 CFR 1910 and 1926;

7. State and local regulations; and

8. Other EPA guidance as provided.

E. Community Relations Plan

The Permittee shall prepare a plan, for the dissemination of information to the public, regarding investigation activities and results.

II. DESCRIPTION OF CURRENT CONDITIONS

The Permittee shall submit a report with the RFI Workplan providing the background information pertinent to the facility as described below. The data gathered during any previous investigations or inspections and other relevant data shall be included, along with a discussion of the quality of the data.

A. Facility Background

The Permittee's report shall summarize the regional location, pertinent boundary features, general facility physiography, hydrogeology, and historical use of the facility for the treatment, storage or disposal of solid and hazardous waste. The report shall include:

1. Maps depicting the following:

   a. General geographic location;

   b. Property lines, with the owners of all adjacent property clearly indicated;

   c. Topography and surface drainage (with a contour interval of one foot or less and a scale of 1 inch = 100 feet) depicting all waterways, wetlands, floodplains, water features, drainage patterns, and surface-water containment areas;

   d. All tanks, buildings, utilities, paved areas, easements, rights-of-way, and other features;

   e. All solid or hazardous waste treatment, storage or

disposal areas active after November 19, 1980;

f. All known past solid or hazardous waste management units regardless of whether they were active on November 19, 1980;

g. All known past and present product and waste underground tanks or piping, above, on or underground, including sewer systems;

h. Surrounding land uses (residential, commercial, agricultural, recreational); and

i. The locations of all production and ground water monitoring wells. These wells shall be clearly labelled and ground and top of casing elevations and construction details included (these elevations and details may be included as an attachment).

All maps shall be consistent with the requirements set forth in 40 CFR Part 270.14 and be of sufficient detail and accuracy to locate and report all current and future work performed at the site;

2. A history and description of ownership and operation, solid and hazardous waste generation, treatment, storage and disposal activities at the facility;

3. Approximate dates or periods of past product and waste spills, identification of the materials spilled, the amount spilled, the location where spilled, and a description of the response actions conducted (local, state or federal response units or private parties), including any inspection reports or technical reports generated as a result of the response; and

4. A summary of past permits requested and/or received, any enforcement actions and their subsequent responses and a list of documents and studies prepared for the facility.

B. Nature and Extent of Contamination

The Permittee's report shall describe the existing information on the nature and extent of contamination with regard to the units and areas of concern detailed in Appendix A of this permit.

1. The Permittee's report shall summarize all possible source areas of contamination. For each area, the Permittee must identify the following, to the extent that information is available:

a. Location of unit/area (which shall be depicted on a facility map);

b. Quantities of solid and hazardous wastes;

c. Hazardous waste or constituents, to the extent known; and

d. Identification of areas where additional information is necessary.

2. The Permittee shall prepare an assessment and description of the existing degree and extent of contamination. This shall include:

a. Available monitoring data and qualitative information on locations and levels of contamination at the facility;

b. All potential migration pathways including information on geology, pedology, hydrogeology, physiography, hydrology, water quality, meteorology, and air quality; and

c. The potential impact(s) on human health and the environment, including demography, ground water and surface water use, and land use.

C. Implementation of Interim Measures

The Permittee's report shall document interim measures which were or are being undertaken at the facility. This shall include:

1. Objectives of the interim measures: how the measure is mitigating a potential threat to human health and the environment and/or is consistent with and integrated into any long term solution at the facility;

2. Design, construction, and operation and maintenance history;

III: PRE-INVESTIGATION EVALUATION OF CORRECTIVE MEASURE TECHNOLOGIES

Prior to starting the facility investigation, the Permittee shall submit to EPA a report that identifies the potential corrective measure technologies that may be used on-site and off-site for the containment, treatment, remediation, and disposal of contamination. This report shall also identify any field data that need to be collected in the facility investigation to facilitate the evaluation and selection of the final corrective measure or measures (e.g., compatibility of waste and construction

materials, information to evaluate effectiveness, treatability of wastes, etc).

IV. RCRA FACILITY INVESTIGATION (RFI)

The Permittee shall conduct those investigations necessary to characterize the facility (environmental setting); define the source (source characterization), degree, and extent of release of hazardous constituents (contamination characterization); and identify actual or potential receptors.

The investigations should result in data of adequate technical content and quality to support the development and evaluation of the corrective measures alternative(s) during the Corrective Measures Study, if necessary.

All sampling and analysis shall be conducted in accordance with the Sampling and Analysis Plan. All sampling locations shall be documented in a log and identified on a detailed site map.

A. Environmental Setting

The Permittee shall collect information to supplement and/or verify existing information on the environmental setting at the facility. The Permittee shall characterize the following as they relate to identified sources, pathways and areas of releases of hazardous constituents from the solid waste management units (SWMUs) and areas of concern (AOCs).

1. Hydrogeology

The Permittee shall conduct a program to evaluate hydrogeologic conditions at the facility. This program shall provide the following information:

a. A description of the regional and facility specific geologic and hydrogeologic characteristics affecting ground-water flow beneath the facility, including:

i) Regional and facility specific stratigraphy; description of strata including strike and dip, identification of stratigraphic contacts;

ii) Structural geology; description of local and regional structural features (e.g., folding, faulting, tilting, jointing, etc.);

iii) Depositional history;

iv) Regional and facility specific ground-water flow patterns;

v) Identification and characterization of areas and amounts of recharge and discharge; and

vi) Characterization of seasonal and temporal variations in the ground water flow regime.

b. An analysis of any topographic features that might influence the ground-water flow system.

c. Based on field data, tests, and cores, a representative and accurate classification and description of the hydrogeologic units which may be part of the migration pathways at the facility (i.e., the aquifers and any intervening saturated and unsaturated units), including:

i) Hydraulic conductivity and porosity (total and effective);

ii) Lithology, grain size, sorting, degree of cementation;

iii) An interpretation of hydraulic interconnections between saturated zones; and

iv) The attenuation capacity and mechanisms of the natural earth materials (e.g., ion exchange capacity, organic carbon content, mineral content, etc.).

d. Based on field studies and cores, structural geology and hydrogeological cross sections showing the extent (depth, thickness, lateral extent) of hydrogeologic units which may be part of the migration pathways identifying:

i) Sand and gravel deposits in unconsolidated deposits;

ii) Zones of fracturing or channeling in consolidated or unconsolidated deposits;

iii) Zones of higher permeability or lower permeability that might direct and restrict the flow of contaminants;

iv) The uppermost aquifer: geologic formation, group of formations, or part of a formation capable of yielding a significant amount of ground water to wells or springs; and

v) Water-bearing zones above the confining layer that may serve as a pathway for contaminant migration including perched zones of saturation.

e. Based on data obtained from ground water monitoring wells and piezometers installed upgradient and downgradient from the potential contaminant sources, a representative description of water level or fluid pressure monitoring including:

i) Water level contour and/or potentiometric maps;

ii) Hydrologic cross sections showing vertical gradients;

iii) The flow system, including the vertical and horizontal components of flow; and

iv) Any temporal changes in hydraulic gradients, for example, due to tidal or seasonal influences.

f. A description of manmade influences that may affect the hydrogeology of the site, identifying:

i) Active and inactive local water supply and production wells with an approximate schedule of pumping; and

ii) Manmade hydraulic structures (pipelines, french drains, ditches, unlined ponds, septic tanks, NPDES outfalls, retention areas, etc.).

g. A description of the local geology and potential contaminant migration pathways. These shall be determined by an appropriate number of borings and boring spacing. The borings shall be located so that reasonably accurate cross-sections can be constructed.

i) All borehole samples shall be collected with a shelby tube, split barrel sampler, rock corer, or other appropriate device and shall be described in the field by an experienced professional in geology. Concise drilling logs and field records shall be prepared.

ii) Samples shall be collected from all borings at intervals equal to 10% of the total depth of the borehole and shall be collected wherever contamination is suspected.

iii) Borings in which permanent wells are not installed and wells being abandoned shall be sealed with material at least an order of magnitude less permeable than the surrounding soil.

2. Soils

The Permittee shall conduct a program to characterize the soil and rock units above the water table in the vicinity of contaminant release(s). Such characterization shall include, but not be limited to, the following activities and information, as appropriate:

a. SCS soil classification;
b. Surface soil distribution;
c. Soil profile, including ASTM classification of soils;
d. Transects of soil stratigraphy;
e. Hydraulic conductivity (saturated and unsaturated);
f. Relative permeability;
g. Bulk density;
h. Porosity;
i. Soil sorption capacity;
j. Cation exchange capacity (CEC);
k. Soil organic content;
l. Soil pH;
m. Particle size distribution;
n. Depth of water table;
o. Moisture content;
p. Effect of stratification on unsaturated flow;
q. Infiltration;
r. Evapo-transpiration;
s. Storage capacity;
t. Vertical flow rate;
u. Mineral content; and
v. Redox potential (Eh).

3. Surface Water and Sediment

The Permittee shall conduct a program to characterize the surface water bodies in the vicinity of the facility. Such characterization shall include, but not be limited to, the following activities and information:

a. Description of the temporal and permanent surface water bodies including:

i) For impoundments: location, elevation, surface area, depth, volume, freeboard, and construction and purpose;

ii) For streams, ditches, and channels: location, elevation, flow, velocity, depth, width, seasonal fluctuations, flooding trends (i.e., 100 year event), discharge point(s), and general contents;

iii) Drainage patterns; and

iv) Evapo-transpiration.

b. Description of the chemistry of the natural surface water and sediments. This includes determining the pH, total dissolved solids, total suspended solids, biochemical oxygen demand, alkalinity, conductivity, dissolved oxygen profiles, nutrients, chemical oxygen demand, total organic carbon, specific contaminant concentrations, etc.

c. Description of sediment characteristics including:

i) Deposition area;

ii) Thickness profile; and

iii) Physical and chemical parameters (e.g., grain size, density, organic carbon content, ion exchange capacity, pH, etc.)

4. Air

The Permittee shall provide information characterizing the climate in the vicinity of the facility. Such information shall include, but not be limited to:

a. A description of the following parameters:

i) Annual and monthly rainfall averages;

ii) Monthly temperature averages and extremes;

iii) Wind speed and direction;

iv) Relative humidity/dew point;

v) Atmospheric pressure;

vi) Evaporation data;

vii) Development of inversions; and

viii) Climate extremes that have been known to occur in the vicinity of the facility, including frequency of occurrence.

b. A description of topographic and man-made features which affect air flow and emission patterns, including:

i) Ridges, hills or mountain areas;

ii) Canyons or valleys;

iii) Surface water bodies (e.g. rivers, lakes, bays, etc.);

iv) Wind breaks and forests; and

iv) Buildings.

B. Source Characterization

The Permittee shall collect analytical data to completely characterize the wastes and the areas where wastes have been placed, collected, or removed, to the degree that is possible without undue safety risks, including: type; quantity; physical form; disposition (containment or nature of deposits); and facility characteristics affecting release (e.g., facility security, and engineering barriers). This shall include quantification of the following specific characteristics, at each source area:

1. Unit/Disposal Area Characteristics:

a. Location of unit/disposal area;
b. Type of unit/disposal area;
c. Design features;
d. Operating practices (past and present);
e. Period of operation;
f. Age of unit/disposal area;
g. General physical conditions; and
h. Method used to close the unit/disposal area.

2. Waste Characteristics:

a. Type of wastes placed in the unit;

i) Hazardous classification (e.g., flammable, reactive, corrosive, oxidizing or reducing agent);

ii) Quantity; and

iii) Chemical composition.

b. Physical and chemical characteristics such as:

i) Physical form (solid, liquid, gas);
ii) Physical description (e.g., powder, oily sludge);
iii) Temperature;
iv) pH;
v) General chemical class (e.g., acid, base, solvent);
vi) Molecular weight;
vii) Density;

viii) Boiling point;
ix) Viscosity;
x) Solubility in water;
xi) Cohesiveness of the waste;
xii) Vapor pressure; and
xiii) Flashpoint.

c. Migration and dispersal characteristics of the waste such as:

i) Sorption capacity;

ii) Biodegradability, bioconcentration, biotransformation;

iii) Photodegradation rates;

iv) Hydrolysis rates; and

v) Chemical transformations.

The Permittee shall document the procedures used in making the above determinations.

C. Characterization of Releases of Hazardous Constituents

The Permittee shall collect analytical data on groundwater, soils, surface water, sediment, subsurface gas, and air contamination in the vicinity of the facility as outlined in the Sampling and Analysis Plan. These data shall be sufficient to define the extent, origin, direction, and rate of movement of contamination. Data shall include time and location of sampling, media sampled, concentrations found, conditions during sampling, and the identity of the individuals performing the sampling and analysis. The Permittee shall address the following types of contamination at the facility:

1. Groundwater Contamination

The Permittee shall conduct a groundwater investigation to characterize any plumes of contamination at the facility. This investigation shall provide at a minimum the following information:

a. A description of the horizontal and vertical extent of any plume(s) of hazardous constituents originating from or within the facility;

b. The horizontal and vertical direction of contaminant movement;

c. The velocity of contaminant movement;

d. The horizontal and vertical concentration profiles of hazardous constituents in the plume(s);

e. An evaluation of factors influencing the plume movement; and

f. An extrapolation of future contaminant movement; and

g. All available monitoring data including sampling locations.

2. Soil Contamination

The Permittee shall conduct an investigation to characterize the contamination of the soil and rock units above the saturated zone in the vicinity of any contaminant release. The investigation shall include the following information:

a. A description of the vertical and horizontal extent of contamination;

b. A description of appropriate contaminant and soil chemical properties within the contaminant source area and plume. This shall include contaminant solubility, speciation, adsorption, leachability, exchange capacity, biodegradability, hydrolysis, photolysis, oxidation and other factors that might affect contaminant migration and transformation;

c. Specific contaminant concentrations;

d. The velocity and direction of contaminant movement; and

e. An extrapolation of future contaminant movement.

The Permittee shall document the procedures used in making the above determinations.

3. Surface Water and Sediment Contamination

The Permittee shall conduct a surface water investigation to characterize contamination in surface water bodies resulting from releases of hazardous constituents at the facility. The investigation shall include, but not be limited to, the following information:

a. A description of the horizontal and vertical extent of any plume(s) originating from the facility, and the extent of contamination in underlying sediments;

b. The horizontal and vertical direction of contaminant

movement;

c. Contaminant velocity;

d. An evaluation of the physical, biological and chemical factors influencing contaminant movement;

e. An extrapolation of future contaminant movement; and

f. A description of the chemistry of the contaminated surface waters and sediments. This includes determining the pH, total dissolved solids, and contaminant concentrations, at a minimum. The Permittee shall specify the analytical methods used to obtain the data.

4. Air Contamination

The Permittee shall conduct an investigation to characterize particulate and gaseous releases of hazardous constituents into the atmosphere. This investigation shall provide the following information, if appropriate:

a. A description of the horizontal and vertical direction and velocity of contaminant movement;

b. The rate and amount of the releases; and

c. The chemical and physical composition of the contaminant(s) released, including horizontal and vertical concentration profiles.

The Permittee shall document the procedures used in making the above determinations.

5. Subsurface Gas Contamination

The Permittee shall conduct an investigation to characterize subsurface gases emitted from buried hazardous wastes and constituents in the subsurface. The investigation shall include, but not be limited to, the following information:

a. Horizontal and vertical concentration profiles of the subsurface gases being emitted;

b. The chemical composition of the gases being emitted; and

c. The rate, amount and density of the gases being emitted.

E. Potential Receptors

The Permittee shall collect data describing the human populations and environmental systems that are susceptible to

contaminant exposure from the facility. Chemical analysis of biological samples and/or data on observable effects in ecosystems shall also be obtained as appropriate. The following characteristics shall be identified:

1. Current local uses and planned future uses of groundwater:

   a. Type of use (e.g., drinking water source: municipal or residential, agricultural, domestic/non-potable, and industrial); and

   b. Location of ground water users, to include withdrawal and discharge wells, within one mile of the affected area.

   The above information shall also indicate the aquifer or hydrogeologic unit used and/or affected.

2. Current local uses and planned future uses of surface waters directly affected by the facility:

   a. Domestic and municipal (e.g., potable and lawn/gardening watering);
   b. Recreational (e.g. swimming, fishing);
   c. Agricultural;
   d. Industrial; and
   e. Environmental (e.g., fish and wildlife propagation).

3. Human use of or access to the facility and adjacent lands, including but not limited to:

   a. Recreation;
   b. Hunting;
   c. Residential;
   d. Commercial;
   e. Relationship between population locations and prevailing wind direction; and
   f. The potential impact on human health including demography, ground water and surface water use and land use.

4. A general description of the biota in surface water bodies on, adjacent to, or affected by the facility.

5. A general description of the ecology within the area adjacent to the facility.

6. A general demographic profile of the people who use or have access to the facility and adjacent land, including, but not limited to; age, sex, and sensitive subgroups.

7. A description of any known or documented endangered or

threatened species near the facility.

F. Investigation Analysis

The Permittee shall prepare an analysis and summary of all facility investigations and their results. The objective of this task shall be to ensure that the investigation data are sufficient in quality (e.g., quality assurance procedures have been followed) and quantity to describe the nature and extent of contamination, potential threat to human health and/or the environment, and to support a Corrective Measures Study. The Investigation Analysis shall include:

A. Data Analysis

The Permittee shall analyze all facility investigation data and summarize the type and extent of contamination at the facility, including sources and migration pathways. The summary shall describe the extent of contamination (qualitative/quantitative) in relation to background levels indicative for the area.

B. Protection Standards

1. Ground Water Protection Standards

The Permittee shall provide information to support the Agency's selection/development of Ground Water Protection Standards for all of the Appendix IX constituents found in the ground water during the Facility Investigation.

a. The Ground Water Protection Standards shall consist of:

(1) For any constituents listed in Table 1 of 40 CFR 264.94, the respective value given in that table (MCL) if the background level of the constituent is below the given in Table 1; or

(2) The background level of that constituent in the ground water; or

(3) A U.S. EPA approved Alternate Concentration Limit (ACL).

b. Information to support the Agency's subsequent selection of any Alternate Concentration Limits (ACL's) shall be developed by the Permittee in accordance with U.S. EPA guidance. For any proposed ACL's, the Permittee shall include a justification based upon the criteria set forth in 40 CPR 264.94(b).

c. The Director shall notify the Permittee in writing of approval, disapproval or modifications and shall specify in writing the reason(s) for any disapproval or

modification of any proposed ACL's.

d. Within 90 days of receipt of the Director's notification or disapproval or modification of any proposed ACL, the Permittee shall amend and submit revisions to the Director.

2. Other Relevant Protection Standards

The Permittee shall identify all relevant and applicable standards for the protection of human health and the environment (e.g., National Ambient Air Quality Standards, Federally-approved state water quality standards, etc.).

G. Laboratory and Bench-Scale Studies

The Permittee shall conduct laboratory and/or bench-scale studies, if necessary to determine the applicability of a corrective measure technology or technologies to facility conditions. The Permittee shall analyze the technologies, based on literature review, vendor contracts, and past experience to determine the testing requirements.

If such studies are to be implemented, the Permittee shall develop a testing plan identifying the type(s) and goal(s) of the study(ies), the level of effort needed, and the procedures to be used for data management and interpretation.

Upon completion of the testing, the Permittee shall evaluate the testing results to assess the technology or technologies with respect to the site-specific questions identified in the test plan.

The Permittee shall prepare a report summarizing the testing program and its results, both positive and negative for submission to EPA.

APPENDIX C

CORRECTIVE MEASURES STUDY (CMS) OUTLINE

I. Identification and Development of the Corrective Measure Alternatives.

- A. Description of Current Situation
- B. Establishment of Corrective Action Objectives
- C. Screening of Corrective Measures Technologies
- D. Identification of the Corrective Measure Alternatives

II. Evaluation of the Corrective Measure Alternatives

- A. Technical/Environmental/Human Health/Institutional
- B. Cost Estimate

III. Justification and Recommendation of the Corrective Measure(s)

- A. Technical
- B. Environmental
- C. Human Health

IV. Reports

- A. Draft
- B. Final
- C. Public Review and Final Selection of Corrective Measures

I. IDENTIFICATION AND DEVELOPMENT OF THE CORRECTIVE MEASURES ALTERNATIVES

Based on the results of the RCRA Facility Investigation (RFI) and consideration of the identified potential corrective measure technologies, the Permittee shall identify, screen and develop the alternatives for removal, containment, treatment and/or other remediation of the contamination based on the objectives established for the corrective action.

A. Description of Current Situation

The Permittee shall submit an update to the information describing the current situation at the facility and the known nature and extent of the contamination as documented by the RFI Report. The Permittee shall provide an update to information presented in the RFI regarding previous response activities and interim measures which have or are being implemented at the facility. The Permittee shall also make a facility-specific statement of the purpose for the response, based on the results of the RFI. The statement of purpose shall identify the actual or potential exposure pathways that should be addressed by corrective measures.

B. Establishment of Corrective Action Objectives

The Permittee shall propose facility-specific objectives for the corrective action. These objectives shall be based on public health and environmental criteria, information gathered during the RFI, EPA guidance, and the requirements of any applicable federal and state statutes. At a minimum, all corrective actions concerning ground water releases from regulated units must be consistent with, and as stringent as, those required under 40 CFR §264.100.

C. Screening of Corrective Measure Technologies

The Permittee shall review the results of the RFI and assess the technologies which are applicable at the facility. The Permittee shall screen the corrective measure technologies to eliminate those that may prove infeasible to implement, that rely on technologies unlikely to perform satisfactorily or reliably, or that do not achieve the corrective measure objective within a reasonable time period. This screening process focuses on elimination those technologies which have severe limitations for a given set of waste and site-specific conditions. The screening step may also eliminate technologies based on inherent technology limitations. Site, waste, and technology characteristics which are used to screen inapplicable technologies are described in more detail below:

1. Site Characteristics

Site data shall be reviewed to identify conditions that may limit or promote the use of certain technologies. Technologies whose use is clearly precluded by site characteristics should be eliminated from further consideration.

2. Waste Characteristics

Identification of waste characteristics that limit the effectiveness or feasibility of technologies is an important part of the screening process. Technologies clearly limited by these waste characteristics should be eliminated from consideration. Waste characteristics particularly affect the feasibility of in-situ methods, direct treatment methods, and land disposal (on/off-site).

3. Technology Limitations

During the screening process, the level of technology development, performance record, and inherent construction, operation, and maintenance problems should be identified for each technology considered. Technologies that are unreliable, perform poorly, or are not fully demonstrated may be eliminated in the screening process. For example, certain treatment methods have been developed to a point where they can be implemented in the field without extensive technology transfer or development.

D. Identification of the Corrective Measure Alternatives

The Permittee shall develop the corrective measure alternatives based on the corrective action objectives and analysis of potential corrective measure technologies. The Permittee shall rely on engineering practice to determine which of the previously identified technologies appear most suitable for the site. Technologies can be combined to form the overall corrective action alternatives. The alternatives developed should represent a workable number of option(s) that each appear to adequately address all site problems and corrective action objectives. Each alternative may consist of an individual technology or a combination of technologies. The Permittee shall document the reasons for excluding any technology.

II. EVALUATION OF THE CORRECTIVE MEASURE ALTERNATIVES

The Permittee shall describe each corrective measure alternative that passes through the initial screening and evaluate each corrective measure alternative and its components. The evaluation

shall be based on technical, environmental, human health and institutional concerns. The Permittee shall also develop cost estimates for each corrective measure.

A. Technical/Environmental/Human Health/Institutional

The Permittee shall provide a description of each corrective measure alternative which includes but is not limited to the following: preliminary process flow sheets; preliminary sizing and type of construction for buildings and structures and rough quantities of utilities required. The Permittee shall evaluate each alternative in the four following areas:

1. Technical

The Permittee shall evaluate each corrective measure alternative based on performance, reliability, implementability and safety.

a. The Permittee shall evaluate performance based on the effectiveness and useful life of the corrective measure:

i) Effectiveness shall be evaluated in terms of the ability to perform intended functions, such as containment, diversion, removal, destruction, or treatment. The effectiveness of each corrective measure shall be determined either through design specifications or by performance evaluation. Any specific waste or site characteristics which could potentially impede effectiveness shall be considered. The evaluation should also consider the effectiveness of combinations of technologies;

ii) Useful life is defined as the length of time the level of desired effectiveness can be maintained. Most corrective measure technologies, with the exception of destruction, deteriorate with time. Often, deterioration can be slowed through proper system operation and maintenance, but the technology eventually may require replacement. Each corrective measure shall be evaluated in terms of the projected service lives of its component technologies. Resource availability in the future life of the technology, as well as appropriateness of the technologies, must be considered in estimating the useful life of the project.

b. The Permittee shall provide information on the reliability of each corrective measure including its operation and maintenance requirements and its demonstrated reliability:

i) Operation and maintenance requirements include the

frequency and complexity of necessary operation and maintenance. Technologies requiring frequent or complex operation and maintenance activities shall be regarded as less reliable than technologies requiring little or straightforward operation and maintenance. The availability of labor and materials to meet these requirements shall also be considered; and

ii) Demonstrated and expected reliability is a way of measuring the risk and effect of failure. The Permittee shall evaluate whether the technologies have been used effectively under analogous conditions, whether the combination of technologies have been used together effectively, whether failure of any one technology has an immediate impact on receptors, and whether the corrective measure has the flexibility to deal with uncontrollable changes at the site.

c. The Permittee shall describe the implementability of each corrective measure including the relative ease of installation (constructability) and the time required to achieve a given level of response:

i) Constructability is determined by conditions both internal and external to the facility conditions and includes such items as location of underground utilities, depth to water table, heterogeneity of subsurface materials, and location of the facility (i.e., remote location vs. a congested urban area). The Permittee shall evaluate what measures can be taken to facilitate construction under these conditions. External factors which affect implementation include the need for special permits or agreements, equipment availability, and the location of suitable off-site treatment or disposal facilities.

ii) Time has two components that shall be addressed: the time it takes to implement a corrective measure and the time it takes to see beneficial results. Beneficial results are defined as the reduction of contaminants to some acceptable, pre-established level.

d. The Permittee shall evaluate each corrective measure alternative with regard to safety. This evaluation shall include threats to the safety of nearby communities and environments as well as those encountered during implementation. Factors to consider are fire, explosion, and exposure to hazardous substances.

2. Environmental

The Permittee shall perform an Environmental Assessment for each alternative. The Environmental Assessment shall focus on the facility conditions and pathways of contamination actually addressed by each alternative. The Environmental Assessment for each alternative will include, at a minimum, an evaluation of the short- and long-term beneficial and adverse effects of the response alternative, any adverse effects on environmentally sensitive areas, and an analysis of measures to mitigate adverse effects.

3. Human Health

The Permittee shall assess each alternative in terms of the extent to which it mitigates short-and long-term potential exposure to any residual contamination and protects human health both during and after implementation of the corrective measure. The assessment will describe the concentrations and characteristics of the contaminants on-site, potential exposure routes, and the potentially affected population. Each alternative will be evaluated to determine the level of exposure to contaminants and the reduction over time. For management of mitigation measures, the relative reduction of impact will be determined by comparing residual levels of each alternative with existing criteria, standards, or guidelines acceptable to EPA.

4. Institutional

The Permittee shall assess relevant institutional needs for each alternative. Specifically, the effects of federal, state and local environmental and public health standards, regulations, guidance, advisories, ordinances, or community relations on the design, operation, and timing of each alternative. If the selected remedy is capping and closure in place, a notation must be made in the land deed.

B. Cost Estimate

The Permittee shall develop an estimate of the cost of each corrective measure alternative (and for each phase or segment of the alternative). The cost estimate shall include both capital and operation and maintenance costs.

1. Capital costs consist of direct (construction) and indirect (non-construction and overhead) costs.

a. Direct capital costs include:

i) Construction costs: Costs of materials, labor (including fringe benefits and worker's

compensation), and equipment required to install the corrective measure.

ii) Equipment costs: Costs of treatment, containment, disposal and/or service equipment necessary to implement the action. These materials remain until the corrective action is complete;

iii) Land and site-development costs: Expenses associated with purchase of land and development of existing property; and

iv) Buildings and services costs: Costs of process and non-process buildings, utility connections, purchased services, and disposal costs.

b. Indirect capital costs include:

i) Engineering expenses: Costs of administration, design, construction supervision, drafting, and testing of corrective measure alternatives;

ii) Legal fees and license or permit costs: administrative and technical costs necessary to obtain licenses and permits for installation and operation;

iii) Start-up and shakedown costs: Costs incurred during corrective measure start-up; and

iv) Contingency allowances: Funds to cover costs resulting from unforeseen circumstances, such as adverse weather conditions, strike, and inadequate facility characterization.

2. Operation and maintenance costs are post-construction costs necessary to ensure continued effectiveness of a corrective measure. The Permittee shall consider the following operation and maintenance cost components:

a. Operating labor costs: Wages, salaries, training, overhead, and fringe benefits associated with the labor needed for post-construction operations;

b. Maintenance materials and labor cost: Costs for labor, parts, and other resources required for routine maintenance of facilities and equipment;

c. Auxiliary materials and energy: Costs of such items as chemicals and electricity for treatment plant operations, water and sewer service, and fuel;

d. Purchased service: Sampling costs, laboratory fees, and professional fees for which the need can be predicted;

e. Disposal and treatment costs: Costs of transporting, treating, and disposing of waste materials, such as treatment plant residues, generated during operations;

f. Administrative costs: Costs associated with administration of corrective measure operation and maintenance not included under other categories;

g. Insurance, taxes, and licensing costs: Costs of such items as liability and sudden accident insurance; real estate taxes on purchased land or right-of-way; licensing fees for certain technologies; and permit renewal and reporting costs;

h. Maintenance reserve and contingency funds: Annual payments into escrow funds to cover (1) costs of anticipated replacement or rebuilding of equipment and (2) any large unanticipated operation and maintenance costs; and

i. Other costs: items that do not fit any of the above categories.

III. JUSTIFICATION AND RECOMMENDATION OF THE CORRECTIVE MEASURE(S)

The Permittee shall justify and recommend a corrective measure alternative using technical, human health, and environmental criteria. This recommendation shall include summary tables which allow the alternative or alternatives to be understood easily. Tradeoffs among health risks, environmental effects, and other pertinent factors shall be highlighted. The Director will select the corrective measure alternative(s) to be implemented based on the results obtained from work completed under Section II and III. At a minimum, the following criteria will be used to justify the final corrective measure or measures.

A. Technical

1. Performance - corrective measure(s) which are most effective at performing their intended functions and maintaining the performance over extended periods of time will be given preference;

2. Reliability - corrective measure(s) which do not require frequent or complex operation and maintenance activities and that have proved effective with wastes and under facility conditions similar to those anticipated will be given preference;

3. Implementability - corrective measure(s) which can be constructed and operated to reduce levels of contamination to attain or exceed applicable standards in the shortest period of time will be preferred; and

4. Safety - corrective measure(s) which pose the least threat to the safety of nearby residents and environments as well as workers during implementation will be preferred.

B. Human Health

The corrective measure(s) must comply with existing EPA criteria, standards, or guidelines for the protection of human health. Corrective measures which provide the minimum level of exposure to contaminants and the maximum reduction in exposure with time are preferred.

C. Environmental

The corrective measure(s) posing the least adverse impact (or greatest improvement) on the environment over the shortest period of time will be favored.

IV. REPORTS

The Permittee shall prepare a Corrective Measures Study Report presenting the results obtained from Sections I through III and recommending a corrective measures alternative. Copies of the preliminary report shall be provided by the Permittee to the Director for approval.

A. Draft

The Report shall at a minimum include:

1. A description of the facility, including a site topographic map.

2. A summary of the corrective measure(s) and rationale for selection;

   a. Description of the corrective measure(s) and rationale for selection;

   b. Performance expectations;

   c. Preliminary design criteria and rationale;

   d. General operation and maintenance requirements; and

   e. Long-term monitoring requirements.

3. A summary of the RFI and impact on the selected corrective measure(s);

   a. Field studies (ground-water, surface water, soil, air); and

   b. Laboratory studies (bench scale, pilot scale).

4. Design and Implementation Precautions;

   a. Special technical problems;

   b. Additional engineering data required;

   c. Permits and regulatory requirements;

   d. Access, easements, right-of-way;

   e. Health and safety requirements; and

   f. Community relations activities.

5. Cost Estimates and Schedules;

   a. Capital cost estimate;

   b. Operation and maintenance cost estimate; and

   c. Project schedule (design, construction, operation).

Three copies of the draft shall be provided by the Permittee to the Director.

B. Final

The Permittee shall finalize the Corrective Measure Study Report incorporating comments received from EPA on the Draft Corrective Measure Study Report. The report shall be submitted to EPA and shall become final upon approval by EPA.

C. Public Review and Final Selection of Corrective Measures

Upon receipt of the Final Corrective Measure Study Report, EPA shall announce its availability to the public for review and comment. At the end of the comment period, the Director shall review the comments and then inform the Permittee of the final decision as to the approved Corrective Measures to be implemented.

APPENDIX D

Compliance Schedule

ACTIVITY & PERMIT CONDITION(S)	DUE DATE
1. Notification of compliance or noncompliance with compliance schedules - Condition I.D.13.	Within 14 calendar days of due date
2. Notification of noncompliance - Conditions I.D.14.a. and I.D.14.b.	Oral notification within 24 hours; written notification within 5 days
3. Notification of newly identified SWMUs and AOCs Condition II.B.1.	Within 15 calendar days of discovery
4. Submittal of SWMU/AOC assessment report - Condition II.B.2.	Within 90 calendar days of notification
5. Notification of newly discovered releases at previously identified SWMUs and AOCs Condition II.C.1.	Within 15 calendar days of discovery
6. Submittal of RFI Workplan for SWMUs and AOCs identified in Appendix A - Condition II.D.1.a.	Within 90 calendar days after effective date of permit
7. Submittal of Description of Current Conditions Report -Appendix B	Within 90 calendar days after effective date of permit
8. Submittal of Pre-investigation Evaluation of Corrective Measures Technologies Report -Appendix B	Prior to starting the RFI investigations. Schedule to be provided in RFI Workplan.
9. Submittal of RFI Workplan(s) for SWMUs and AOCs - Conditions II.B.3., II.C.2., II.D.1.b.	Within 90 calendar days after receipt of notification by EPA of which SWMUs and AOCs require an RFI
10. Demonstration of Financial Assurance for RFI/CMS/IM Condition II.K.	Within 45 calendar days of EPA approval of RFI and/or IM Workplan.
11. Submittal of progress reports - Condition II.D.3.a.	Monthly, beginning 30 calendar days from the starting date specified by EPA
12. Submittal of Draft RFI report Condition II.D.3.b.	In accordance with the approved RFI Workplan

Activity	Due Date
13. Submittal of Final RFI report - Condition II.D.3.b.	Within 45 calendar days after receipt of EPA comments on RFI report
14. Submittal of Interim Measures Plan - Condition II.E.1.a.	Within 30 calendar days of notification by EPA
15. Submittal of Interim Measures Progress reports Condition II.E.3.a.	Monthly
16. Submittal of Interim Measures report - Condition II.E.3.b.	Within 60 calendar days of completion
17. Submittal of CMS plan - Condition II.F.1.a.	Within 60 calendar days of of notification by EPA that a CMS is needed
18. Submittal of Draft CMS report - Condition II.F.3.a.	In accordance with the approved CMS Plan.
19. Submittal of Final CMS report - Condition II.F.3.a.	Within 30 calendar days of EPA comments on draft CMS report
20. Demonstration of financial assurance - Condition II.G.3.	Within 90 calendar days after permit modification for remedy
21. Imminent Hazard report Conditions II.I.1. and II.I.2.	Oral notification within 24 hours; written notification within 5 days
22. Waste Minimization Certification - Condition III	Annually from effective date of permit

The above submissions must be signed and certified in accordance with 40 CFR §270.11.

APPENDIX E

WASTE MINIMIZATION CERTIFICATION

The Waste Minimization Certification shall include the following elements:

Top Management Support

1. Dated and signed policy describing management support for waste minimization and for implementation of a waste minimization plan.

2. Description of employee awareness and training programs designed to involve employees in waste minimization planning and implementation to the maximum extent feasible.

3. Description of how a waste minimization plan has been incorporated into management practices so as to ensure ongoing efforts with respect to product design, capital planning, production operations, and maintenance.

4. Identification of Waste Minimization Team or responsible coordinator.

Characterization of Waste Generation

1. Description of Permittee's method for accounting of waste generation that is capable of measuring and recording waste generation by weight or volume.

2. Block and/or flow diagrams which identify the waste streams, the processes generating the waste streams, and the method of managing that waste stream.

3. Identification of all hazardous waste streams and the characteristics and properties of each hazardous waste stream.

4. A list, in order of quantity and/or toxicity, of the hazardous waste streams generated annually.

5. An index by which waste minimization progress can be measured for each subject waste stream.

Periodic Waste Minimization Assessments

1. Identification of all points in a process where materials can be prevented from becoming a waste or can be recycled.

2. Documentation that the following options were considered: (a) Source reduction and (b) Recycling/reuse.

3. Description of the Permittee's method for conducting the technical evaluation and feasibility study. (Only the

description and results of the technical evaluation and feasibility study need to be submitted).

4. Description of technically and economically practical waste reduction/recycling options to be implemented and a planned schedule for implementation.

5. A demonstration that the selected option satisfies the following technical standards:

- Applies generally accepted engineering, scientific or economic principles and practices.
- Achieves waste reduction without transference to other environmental media unless there is an environmental benefit from such transference.
- Is consistent with the following hazardous waste management practices hierarchy: (1) source reduction, (2) recycling, (3) treatment, and (4) disposal.
- Does not involve conduct which is prohibited by any applicable law or regulation.
- Provides a basis for charting waste reduction trends over time.
- Applies those technically and economically feasible release reduction alternatives which are most effective in reducing the volume or toxicity of waste.

6. Specific performance goals, preferably quantitative, for the source reduction of waste by stream. Whenever possible, goals should be stated as weight of waste generated per standard unit of production, as defined by the generator.

Cost Allocation System

1. Identification of waste management costs for each waste, factoring in liability, transportation, recordkeeping, personnel, pollution control, treatment, disposal, compliance and oversight costs to the extent feasible.

2. Description of how departments are held accountable for the wastes they generate.

3. Comparison of waste management costs with costs of potential reduction and recycling techniques applicable to each waste.

Technology Transfer

1. Description of efforts to seek and exchange technical information on waste minimization from other parts of the company, other firms, trade associations, technical assistance programs, and professional consultants.

Program Evaluation

The Permittee must evaluate the effectiveness (e.g., percent of waste reduction or equivalent) of its waste minimization program. This evaluation must include:

1. Description of types and amounts of hazardous waste reduced or recycled.

2. Analysis and quantification of progress made relative to each performance goal established and each reduction technique to be implemented.

3. Amendments to waste minimization plan and explanation.

4. Explanation and documentation of reduction efforts completed or in progress before development of the waste minimization plan.

5. Explanation and documentation regarding impediments to hazardous waste reduction specific to the individual facility.